THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARRET AT LARGE.

The most important development of the week in the iron trade was the decision of the associated Southern furnaces to reduce the price of pig iron for delivery in the second half of the year to the basis of $17.50, Birmingham, for No. 2 foundry. Prices asked since the beginning of the year have been $18.50 for No. 2 by association furnaces, and $18 by other furnaces. Whether furnaces which have not co-operated in the association will be willing to adhere to the $17.50 basis remains to be seen. No stimulus to buying for the second half has resulted from the above action, but April and May are expected to see a good buying movement. Prices for Southern foundry iron have been considerably above those of Northern furnaces and the reduction just made establishes a substantial parity. Northern furnaces have done considerably more business for the second half than those in the South, and it is now to be determined by the course of the market whether Southern brands can retake on an even basis some of the ground that has been lost. Another consideration in the making of the new prices was the replacement of foreign irons which have been so important a factor in the Eastern market the past year. February imports, however, showed a decided falling off from those of January, and it may safely be predicted that foreign iron will be a diminishing factor for the remainder of the year. The new schedule of prices for Southern iron does not yet make the concession on gray forge which Western rolling mills and pipe works have thought necessary, and there may be further waiting in that market. In Bessemer iron a 20,000-ton sale, in reality a conversion deal, is reported from Pittsburg. The buying by large interests is still delayed. The rumors of absorptions by the United States Steel Corporation, so generally accepted as likely to have early official confirmation, are still in the rumor stage, and there seems to be in one instance at least an actual hitch in negotiations. The finished material market continues active and March showed the largest record for new tonnage booked, in an entire year. The markets for sheets, tinplates and wrought pipe have developed favorably for independent producers, the new business being conspicuously good. Independent producers have made some purchases of steel. One 5,000-ton sale of 4x4-inch billets is reported at $31.50 Pittsburg. The large agricultural interests have not yet closed their purchases of bars for the year beginning July 1. A meeting of the steel bar manufacturers will be held in Pittsburg next week. There is some speculation as to the possibility of an advance effective on an announced date and an offer of the old price to large customers who close meanwhile. The Eastern plate manufacturers have reduced their premium for early deliveries $2 a ton, but are still $5 or $6 a ton above the agreed price at Central Western mill.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, April 1.

The aggregate tonnage of all finished material closed by the large local steel companies, during the month of March, was larger than during any month in the past twelve. Heavy buying was not limited to any one line, as the buying was general, and from the large number of inquiries now at hand there is little doubt that the month of April will fully equal March. The increased demand for pipe, tin plate and sheets was especially encouraging inasmuch as many of the independent mills have been suffering from want of business, but are now operating their plants in view of the increased demand.

The largest transaction in pig iron closed in the week was on a conversion basis and called for the delivery of 20,000 tons of Bessemer iron in the last half of the year, the iron going in at $20.15, Youngstown, or $21, Pittsburg. While the inquiries for foundry iron for delivery over the second half are numerous, little business is being closed. The fact that so few melters in this district have covered requirements for future deliveries has spurred the Southern furnaces to make a bid for a portion of this tonnage, and it is probable that $21.85 and as low as $21.35 may be named by some of the largest Southern producers for second half delivery before the end of the week. Coke shipments to furnaces in the Mahoning and Shenango Valleys continue excellent and with few exceptions the furnaces are producing their normal output. On May 1 a number of contracts for their product which outside coke producers have with the H. C. Frick Coke Co. will expire and this tonnage will thereafter be sold in the open market. However, most of such contracts expired on the first of the year. A number of the largest consumers of furnace coke have covered requirements for the last half during the past week at $4 at the ovens and offers were made the coke operators of $3.50 for the first half of next year, but were refused.

A meeting of the steel plate manufacturers will be held in New York on Thursday for the purpose of considering the present situation, but no change in prices is anticipated. The Eastern plate manufacturers who have been receiving 2c for their product have made a reduction in price of $2 per ton, but even this quotation is $6 above the agreed quotations of the Western mills. Plates for prompt delivery are commanding from $3 to $4 premium and as high as $5 and $6 has been secured on small lots. Some independent manufacturers of black sheets are also asking from $2 to $3 above the quotations of the American Sheet Steel Co. for early delivery and an advance in prices by the largest consumer is anticipated daily. The corrugated roofing manufacturers have advanced prices 10 cents a square on painted and 20 cents on galvanized, making painted $2 a square and galvanized $3.50. The cut nail manufacturers have also advanced prices 5 cents a keg, thus increasing the spread between the selling price of cut and wire nails.

The independent pipe manufacturers have issued a uniform price list which is considerably lower than that of the National Tube Co. on iron pipe, while it is somewhat higher on steel pipe. This is the first time that the independent manufacturers have agreed upon quotations and there is little doubt

that these will be maintained as long as the present demand continues as at present.

Purchases of iron ore for 1903 by interests having furnaces in this district and in the valleys are estimated at 1,000,000 tons. Concerns owning and controlling large bodies of ore property in the Lake Superior regions have been the largest buyers. Their reason for buying ore in the open market, in preference to working their own properties is that the ore in the ground is growing more valuable every year and by conserving their resources they will be in a better position to compete in years to come. One local concern having control of upwards of 10,000,000 tons of ore on the Mesabi range has done nothing further than prospect the property and will not operate until the market price of ore is higher than it is today. These interests have purchased ore at this time, despite the advance in prices for 1903 ores, owing to the guarantee on every contract insuring uniform prices for all.

Today the corporate existence of the Carnegie Steel Co., a consolidation of the Carnegie Co., American Steel Hoop Co. and the National Steel Co., begins. While these companies have been practically one for the past year or more, they retained their individuality until this week. The deal for the absorption of the Clairton Steel Co., together with the vast ore interests controlled by W. P. Snyder & Co. and the Shenango Furnace Co. by the United States Steel Corporation, is still pending. The freshly rumored absorption of the Jones & Laughlin Steel Co. is again denied.

PIG IRON.—On a conversion arrangement 20,000 tons of Bessemer iron exchanged hands this week on a basis of $20.15 at the Valley furnace. Large negotiations for Bessemer for second half delivery are still pending. Round lots of Bessemer are now being offered at $21, Pittsburg, for second half delivery, while we note the sale of 5,000 tons at $21.50, Pittsburg, for delivery through the third quarter. Purchases of foundry iron for the second half of the year amount to about 5,000 tons at prices ranging from $21.60 to $22.15. Southern furnaces have been offering No. 2 at $23.35 and it is expected that still lower quotations will be made for this delivery. Forge iron in large lots for delivery the remainder of this half is extremely scarce and small lots are firm at $21. Foreign foundry iron is offered at $21.50 for early delivery and small sales continue to be made daily. We quote as follows:

Bessemer, Valley	$21 00 to 21 50
Bessemer, Pittsburg	21 85 to 22 10
No. 1 Foundry	23 50 to 24 00
No. 2 Foundry	22 50 to 23 00
Gray Forge, Pittsburg	20 75 to 21 00
Chilled Basic, Valley	21 00 to 21 25
Chilled Basic, Pittsburg	21 85 to 22 10

STEEL.—We note the sale of 5,000 tons of Bessemer billets, 4x4 and larger, at $31.50, Pittsburg, for early delivery. This is the first sale that has been made for some time, the absence of transactions being due both to the high quotations for steel and its scarcity. Open-hearth billets are held at prices ranging from $31.50 to $33 according to the carbon. Foreign steel is no longer attractive in this market owing to its high price. Rods are in good demand and are held at $36 to $36.50 for Bessemer and $37 to $37.50 for open-hearth.

FERRO-MANGANESE.—There is practically nothing doing in this product at the present time, as nearly all the large consumers have covered their requirements for some time in the future. English ferro, 80 percent, is quoted at $50 in 50-ton lots and over, delivered at buyer's mill, while smaller lots are quoted at $52.50.

SPELTER.—The spelter market continues to advance and prime western grades are held at 5.60c to 5.62½c, Pittsburg, in large lots.

MUCK BAR.—The offerings of Eastern muck iron still continue heavy and the Western mills are unable to compete at the prices quoted. We quote $35 and $36.

SKELP.—Grooved iron skelp is very scarce and is not to be had for early delivery. The same is true of steel skelp. The market is very firm. Iron skelp, sheared is held at 2.10c to 2.15c, while grooved is held at 2.15c to 2.20c. Steel skelp is held at 2c to 2.05c.

RAILS AND TRACK MATERIAL.—Mills rolling light rails continue to report a brisk demand. Some new business in heavy sections is also under negotiation. We quote: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds in carload lots, $39; less than carload lots, $40; 12, 16 and 20 pounds, $36; 25 to 40 pounds, $36. Track materials: Spikes, 2.15c to 2.25c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

PLATES.—A meeting of the steel plate manufacturers will be held in New York on Thursday, but no change will be made in prices. The Eastern plates producers last week reduced their prices $2 per ton and have placed them on a basis of 1.90c, which is still $6 above the agreed quotations of the Western mills. Plates for early delivery command premiums from $3 to $5 per ton. Agreement quotations are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.75c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive fire-box, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

BARS.—We note sales of 4,000 tons of iron bars during the week for forward delivery. Current business in steel bars was also heavy. The agricultural implement manufacturers have not yet placed contracts, but are expected to close within the next month or six weeks. We quote as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c to 1.85c, Youngstown, or 1.84¾c to 1.89¾c, Pittsburg, with freight added to point of delivery from Youngstown. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

STRUCTURAL MATERIAL.—The Jones & Laughlin Steel Co. this week secured the contract for furnishing all the structural steel for the new Nixon theater here, amounting to about 1,500 tons. Little progress is being made by the American Bridge Co. in resuming operations with non-union men and no negotiations are on at present for a conference looking toward a settlement of the grievances. Light angles are scarce and continue to be quoted at 2c to 2.10c for early delivery. Agreement prices are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—The independent manufacturers have issued uniform quotations which are somewhat lower than those of the National Tube Co. on iron pipe and somewhat higher on steel pipe. The demand is very heavy and prompt pipe is held at a premium. Discounts in carload lots, plus the freight to destination, as follows:

MERCHANT PIPE.

	Steel		Wrought Iron	
	Black Percent.	Galv. Percent.	Black Percent.	Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	65	53	61	50
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	66	54	62	51
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53

Threads only—Same as Plain End, plus 1¼ percent net.
Threads and Couplings—Same as Plain End, plus 2½ percent net.

Double Extra Strong Plain End				
½ to 8 inch	59	49	55	45

Threads only—Same as Plain End, plus 2 percent net.
Threads and Couplings—Same as Plain End, plus 8 percent net.

NOTE: Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1¼ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4½ to 12½ inches	63

SHEETS.—The sheet market continues very strong and independent manufacturers are quoting from $2 to $3 above the prices of the American Sheet Steel Co. for early delivery. Galvanized sheets also continue strong and are in big demand. The corrugated sheet manufacturers last week advanced prices to $2 a square for painted and galvanized to $3.50. We make the following quotations in 500-bundle lots and over: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.60c; No. 18, 2.85c; No. 26, 3.35c; No. 27, 3.60c; No. 28, 3.85c; No. 29, 4.35c; No. 30, 4.50c.

WIRE AND WIRE NAILS.—At a meeting of the cut nail manufacturers held last week cut nails were advanced 5 cents a keg. The wire and wire nail market continues exceptionally strong and a still further advance in wire nails is anticipated. We quote: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2.00; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

MERCHANT STEEL.—Demand for shafting continues very strong and large buyers are covering their requirements for the next six months. There is some cutting on some grades of crucible steel, but the finer grades continue strong and prices are maintained: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

OLD MATERIAL.—Heavy melting stock continues scarce and we note the sale of 1,000 tons for early delivery at $22.15, gross tons, Pittsburg. No 1 cast scrap is held firm at $20 to $20.50, while machinery scrap is quoted at $19. We make the following quotations, gross tons: Heavy melting stock, $21.50 to $22.15; low phosphorus melting stock, $25 to $25.50; steel rails, $21 to $21.25; re-rolling rails, $22.50 to $23; No. 1 cast scrap, $19.50 to $20; borings, $11 to $11.50; bushelling scrap, $17.50 to $18.50; old iron rails, $24.50 to $25; turnings, $15 to $15.50.

COKE.—Contracts for furnace coke for delivery the last half of the year continue to be placed at $4 at the ovens for Connellsville and $3.75 for outside coke. For delivery the first half of 1904, $3.50 has been offered, but the coke operators will not close at this price. For the week ending Saturday, March 21, the production of the upper Connellsville region amounted to 247,000 tons, and that of the lower region 50,721 tons. The stocks in the region are almost entirely cleaned up and the movement of cars is nearly normal. Furnace coke for prompt shipment is held at $5 to $5.50 and foundry at $6 to $6.50.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, March 31.

The apathetic attitude of Western foundrymen in the matter of contracting for their requirements from July to December has forced Southern furnaces to lower their quotations for deliveries within this period. At a meeting of the furnacemen's association held at Birmingham, Ala., Saturday, March 28, it was decided to announce a reduction of $1 a ton on all foundry grades, making the official price of No. 2 foundry for deliveries in the last half $17.50, Birmingham, or $21.85, Chicago, the same to go into effect April 1. Considerable inquiry for pig iron for shipments commencing July 1 has come to the front in the past two weeks, and some small sales have been made on the basis of $18, Birmingham; but most of the inquiries were in the nature of "feelers" and were immediately withdrawn as soon as the situation was learned. Foreign iron has gradually been working its way westward because of the high prices asked for Southern grades, and while never popular among melters in this section, the association feared that unless prompt action was taken, it would again be offered in this market. For this reason, and to stimulate buying for the last half, official quotations have been reduced to the above basis.

There has been a heavy demand during the week under review for all kinds of finished iron and steel. A Western railroad, with headquarters in Chicago, placed a supplementary order with the local mill for 10,000 tons of heavy rails for delivery in the latter part of the year. A large tonnage has also been booked in light rails and track supplies, the business coming mostly from electrical roads. Efforts were made during the week to place orders for 5,000 tons of wire rods, but on account of their scarcity in this market, buyers were compelled to go East. Contracts for 12,000 tons of structural steel for railroad bridges are being figured on and orders have been let for two buildings to be erected in this city, requiring 2,500 tons of shapes and castings. Structural mills are two months behind on heavy beams and channels, and six months on lighter shapes; three weeks on light angles, and four months on heavy angles. Implement and wagon manufacturers have been buying freely of bar iron and steel for deliveries extending through the remainder of the year; and several consumers of steel, whose requirements run into many thousand tons, have been sounding the market preparatory to placing contracts for their needs from July, 1903, to July, 1904. It is officially denied that the bar iron combination has been definitely called off, the promoters stating that the matter is still in statu quo. Plates are in good demand, and for prompt shipment premiums of $1 to $3 a ton are asked. Sheets are also firm, the market gaining in strength. The leading manufacturer of wire products is ten weeks behind on orders for field fencing; two to three weeks on barbed wire and wire nails, and 30 days on smooth wire. New business is extremely heavy. Merchant pipe and boiler tubes are strong, buying being of good volume. The scrap iron market has increased firmness, the demand being greater than the supply, especially in busheling scrap and cast iron. Coke is easier, due to the increasing efficiency of railroads in the matter of deliveries.

PIG IRON.—There has been additional inquiry in the past week for deliveries in the second and third quarter, and in some instances running through to the end of the year. No contracts for large lots, however, have been placed, such buying as has been done continuing to be for small lots for quick shipment. The announcement that the Southern Furnace Association will put into effect April 1 a new scale of prices for the last half will no doubt actively stimulate buying for this period. At a meeting held at Birmingham, Saturday, the 28th, it was decided to make a reduction of $1 a ton from the present Birmingham basis, the official quotations on No. 1 foundry and soft now being $18; No. 2, $17.50; No. 3, $17; gray forge, $16. That the time is opportune for making this change in prices is evidenced by the increasing interest shown by melters for needs in the last half. One local seller has been asked to quote on 2,000 tons of No. 2 foundry, 3,000 tons of No. 3 foundry and 2,000 tons of No. 4; another seller reports inquiry for three to four thousand tons for the second quarter, and four to five thousand tons for the last half. Another office has an inquiry for 1,000 tons of malleable Bessemer for the last half, and for 1,500 tons of a special Bessemer grade for the same delivery, which will probably be purchased in England owing to the crowded condition of the few domestic furnaces making this grade of iron. A number of these inquiries have no doubt been sent to every local office, but the aggregate tonnage for those mentioned does not represent the total tonnage on which quotations have been asked. There is a brisk demand for silvery irons, and sales of 8 to 10 percent silicon have been made at $31.30, Chicago. A few hundred tons of 7 percent ferro-silicon is also being offered at $27.50 to $29.50, Chicago. There is some demand for standard Bessemer in carload lots, which is offered at $24.30; though Valley furnaces are offering

$23.50 on larger tonnages. The market on spot iron, generally speaking, is firm on the basis of $18.50, Birmingham, for No. 2, though instances are reported where this price has been shaded 25 to 50 cents. A report is current that a cargo of foreign iron, consisting of 3,000 tons of No. 4 foundry, has been offered at $21.50, Chicago, but it could not be traced to any seller. A consignment of 1,000 tons of foreign No. 2 was rejected a short while ago by a local foundryman and resold in this market, which is probably the basis for the former rumor. The minimum quotations given below are for Southern iron for delivery in the last half; for shipment in the second quarter, $1 a ton is to be added. We quote as follows:

Lake Superior Charcoal	**$26 50 to 27 50**
Local Coke Foundry No. 1	**23 50 to 24 50**
Local Coke Foundry No. 2	**23 00 to 24 00**
Local Coke Foundry No. 3	**22 50 to 23 50**
Local Scotch Foundry No. 1	**24 00 to 24 50**
Southern Coke No. 1	22 35 to 23 35
Southern Coke No. 2	21 85 to 22 85
Southern Coke No. 3	21 35 to 22 35
Southern Coke No. 4	20 85 to 21 85
Southern No. 1, soft	22 35 to 23 35
Southern No. 2, soft	21 85 to 22 85
Southern Gray Forge	20 35 to 21 85
Southern Silveries (according to silicon)	**26 15 to 27 15**
Jackson Co. Silveries, 6 to 8 percent silicon	**31 30 to 32 30**
Ohio Strong Softeners	**26 30 to 26 80**
Alabama and Georgia Car Wheel	**27 35 to 28 35**
Malleable Bessemer	**23 00 to 24 00**
Standard Bessemer	**23 30 to 24 30**
Basic Iron	**22 35 to 22 85**

BARS.—It is officially denied by the promoters that the effort to consolidate the western bar iron mills has been definitely called off. The situation is unchanged from the condition matters were left in after the first efforts to effect the combination. The buying in the past week of both iron and steel bars has been heavy, several implement and wagon manufacturers having covered for their requirements for the year ending July, 1904. It is significant that the buying and inquiry for steel is considerably heavier than that for iron, and this fact has largely influenced local mills in lowering the price of the latter to 1.80c. Some manufacturers are still holding out, however, for 1.85c to 1.90c. Several consumers, whose annual individual requirements run into five figures, have been sounding steel mills on prices for yearly contracts commencing July 1, and a heavy buying movement in this product is anticipated within the near future. We quote mill shipments, Chicago delivery, as follows: Bessemer steel, 1.76½c; angles, less than 3x3, 1.86½c base; hoops, in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c; iron, 1.80c to 1.90c. Store prices are as follows: Steel, 2c to 2.10c; iron, 2.15c to 2.20c; hoops, 2.40c to 2.50c; angles, 2.25c rates.

SHEETS.—There is no diminution to be noted in the heavy demand that has existed for several weeks, and both black and galvanized sheets at the advanced prices are very firm. We quote mill shipments, carload lots, Chicago delivery: Black sheets, No. 27, 2.91½c; No. 28, 3.01½c. Galvanized, No. 27, 3.70c to 3.90c; No. 28, 3.80c to 4.10c. On lots from store, we quote: Black, No. 27, 3c to 3.10c; No. 28, 3.10c to 3.20c. Galvanized, 75 percent.

STRUCTURAL STEEL.—There is a good demand from railroads for bridge material, figures being taken on jobs that will require not less than 12,000 tons. Contracts for the steel have been let for two small buildings to be erected in this city, calling for about 2,500 tons of steel shapes and castings. Mills report they are two months behind orders on heavy beams and channels; six months on light beams and channels; three weeks on light angles, and four months on heavy angles. Store trade has been very brisk, all the local yards doing a business equivalent to their full capacity. We quote mill prices, Chicago delivery: Beams and channels, 15 inches and under, 1.75c to 2c; 18 inches and over, 1.85c to 2.10c; universal plates, 1.80c to 2.10c; angles, 3x3 and larger, 1.75c to 2c; tees, 3x3 and larger, 1.80c to 1.90c; zees, 1.75c to 1.95c. The maximum quotations are asked by mills and dealers on lots for quick shipment. Store trade is quoted at 2.¼c to 2½c per pound.

PLATES.—There has been a big demand and prices are very firm. The local mill has withdrawn from the market. Premiums are asked and cheerfully paid for quick shipment. We quote mill shipments, Chicago delivery: Tank steel, ¼-inch and heavier, 1.80c to 1.90c; flange steel, 1.90c to 2.05c. Prices for lots from stock: Tank steel, ¼-inch and heavier, 2.15c to 2.25c; 3-16, 2.25c to 2.35c; No. 8, 2.30c to 2.40c; No. 10, 2.35c to 2.45c; flange steel, 2.40c to 2.50c.

RAILS AND TRACK SUPPLIES.—A western railroad has placed a supplementary order with the local mill for 10,000 tons of heavy sections for delivery late in the year. Electrical railroads have been brisk buyers of light rails and track supplies in the past week, the total tonnage of the former being of good proportions. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; light rails, 45 pounds, $34 to $35; 12 pounds, $39 to $40, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c (out of store, carload lots, 2.35c to 2.45c rates); second quality, 2.10c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.15c, with usual differentials for other sizes.

MERCHANT STEEL.—A small amount of buying for the last half has been transacted in the past week, though inquiries for yearly needs commencing July 1, coming from implement manufacturers, grow more numerous. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 to 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

MERCHANT PIPE.—A good business has been transacted, and railroads are showing considerable improvement in the matter of providing cars and forwarding material en route. We quote on carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ to ¾ in inclusive	**66.35**	**56.35**	**63.35**	**53.35**
¼ inch	**68.35**	**58.35**	**65.35**	**55.35**
7 to 12 inches, inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

BOILER TUBES.—The demand keeps up to past proportions, and jobbers report a healthy trade and firm market. We quote prices on carload lots, mill shipments, f. o. b. Chicago. On less than carload lots from mill, 12½ percent is to be added:

	L. W. Steel Percent.	C. C. Iron Percent.
1 to 1¼ in	**43.35**	**38.35**
1¼ to 2½ in	**55.85**	**35.85**
2¼ to 5 in	**60.85**	**45.85**
6 to 13 in	**55.85**	**35.85**

For lots direct from warehouse stock:

	L. W. Steel Percent.	C. C. Iron Percent.
1 to 1¼ in	**40**	**35**
1¼ to 2½ in	**50**	**32½**
2¼ to 5 in	**57½**	**42½**
6 to 13 in	**50**	**32½**

CAST IRON PIPE.—There is no change from the situation reported last week. New business is quiet, being limited to small lots for quick shipment. We quote f. o. b. Chicago, 4-inch water pipe, $34; 6-inch, $33; 8-inch and upwards, $32; gas pipe, $1 a ton higher.

BILLETS AND WIRE RODS.—Inquiries have been made from local manufacturers for 5,000 tons of wire rods, but owing to the scarcity of this product, buyers were compelled to seek eastern markets. We quote wire rods (the last sale) $40; open-hearth billets for use in rolling mills, $33; open-hearth billets for forging purposes, $36; German basic Bessemer billets, $32.50 Chicago. Special carbons are higher.

WIRE NAILS AND FENCING.—Local producers report an unprecedented demand for all kinds of wire products from all parts of the west. Deliveries on field fencing are 10 weeks behind; barbed wire and wire nails, two to three weeks; smooth wire 30 days. We quote prices to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in smaller lots; galvanized, carloads, $2.40; smaller lots, $2.50. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90. Staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; smaller lots, $2.70. Bale ties, 85 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

COKE.—The market is somewhat easier and deliveries more ample. Connellsville coke is quoted $9.50 to $10, spot track Chicago; though on contracts a lower price can be obtained, one manufacturer quoting $6.10 at the ovens. Southern coke is offered at $8.50 to $9 spot, Chicago.

OLD MATERIAL.—The market is very strong, demand being of good proportions. Country dealers are not shipping with the frequency or tonnage of several weeks ago, the scarcity being most pronounced in busheling scrap and cast iron. We quote gross tons as follows:

Old iron rails	$23 50 to 24 00
Old steel rails (mixed lengths)	18 00 to 18 50
Old steel rails (long lengths)	21 50 to 22 00
Relaying rails	31 50 to 32 00
Old wheels	22 00 to 23 50
Heavy melting steel	17 00 to 17 50
Mixed country steel	15 00 to 15 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$19 50 to 20 00
No. 2 R. R. wrought	18 00 to 18 50
Shafting	19 00 to 19 50
Dealers' forge No. 1	16 50 to 17 00
No. 1 busheling and wrought pipe	14 00 to 14 50
No. 1 cast	17 00 to 17 50
Railway malleable	15 50 to 16 00
Country malleable	15 00 to 15 50
Iron axles	23 50 to 24 00
Steel axles	19 50 to 20 00
Cast borings	10 00 to 10 50
Mixed borings, etc	9 50 to 10 00
Wrought turnings	13 50 to 14 00
Machine shop turnings	13 50 to 14 00
Iron axle turnings	14 00 to 14 50
Steel axle turnings	13 50 to 14 00
Stove plate and light cast scrap	13 00 to 13 50
Old iron splice bars	21 00 to 21 50

H. A. Forsyth, the local representative of M. A. Hanna & Co., in the sale of the product of the Pioneer furnaces of the Republic Iron & Steel Co., has transferred his headquarters to Detroit, Mich., where he will act as the sales agent for the product of the Detroit Iron & Steel Co.'s furnace, which is sold through M. A. Hanna & Co.

The Carbon Steel Co., New York, on April 1 opened an office in Chicago, room 1414 Fisher building, under the charge of Mr. Edward K. Harris.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, April 1.

Some progress has been made in settling controversies as to wages of employes on docks and vessels, an agreement with the ore shovelers at 14 cents per ton having been reached and a partial adjustment with the tugmen having been made, but the wages of firemen, oilers and others have not been fixed and another week may pass before all pending questions are settled. Navigation will not, therefore, begin as soon as was expected, although some ore on the ranges is moving toward the docks. There is very little discussion as to rates of freight and probably there will not be until all the labor controversies are ended.

IRON ORE.—Sales of ore are almost at a standstill. One large company has done a very fair business, but the general report is that furnacemen are not ready to buy. Many representatives of ore firms have been traveling during the past two weeks, and they have found substantially the same state of sentiment. The furnaces have in stock rather more ore than was estimated, many being provided with enough to meet all requirements until August, while a few, although lacking some ore for their mixtures, have almost enough to last up to next January. Under these conditions, furnacemen see no reason for going into the market at present. Some inquiry has been made as to the probability of Eastern consumers who usually use Lake Superior ores deciding to buy foreign ores. There is no immediate prospect of this being done, because ocean freights on ores are at present prohibitive and because there is no demand for such foreign ores as are now in the yards of importers. Cuban ores, as is well known, are now in the hands of a large Eastern consuming interest. The condition of furnaces which use foreign ores is about the same as that of furnaces using Lake Superior or other American ores. One large consumer of Cuban ore has 350,000 tons in its yards in Maryland. Ocean freights may be suddenly reduced, as has often been done in the past, and in that event foreign ores would become a more important factor.

PIG IRON.—The action of association furnaces of the South in deciding to reduce the price of No. 2 foundry for the last half to $17.50 is not accepted in this city by sellers as furnishing any indication that prices of Northern iron will be lower It is considered that the Southern price has been high as compared with the Northern and that the new figures, plus the freight, giving $21.85 as the Cleveland price for Alabama iron, merely puts the Northern and Southern irons on the same basis, as $21 has been the usual asking price for Northern for the last half. It is pointed out that the Southern association furnaces have sold practically nothing for the last half, while a conservative local authority estimates that Northern furnaces have sold between 25 and 50 percent of their product for the second half and he calls attention to the fact that many furnaces, on account of the hard usage of irregular operation of last year, will be blown out this summer for extensive repairs. In spite of these observations, sales of pig iron, while more numerous than they were two weeks ago, are not large and there is a tendency toward easier prices when an order of fair size is placed, as, for example, in the sale this week of 1,000 tons of No. 2 foundry at $21, Valley, for delivery beginning in April and extending through two or three months. We also note a sale of No. 1 foundry for prompt delivery at $22.50 at the furnace. The usual figure for spot iron is on a basis of $23 for No. 2 Northern foundry, Cleveland delivery. Gray forge sold within a few days at $20 for delivery in July, August and September. Lake Superior charcoal has declined, as usual, at the opening of navigation, when it can be brought to Cleveland by vessel rates instead of by railroad. We quote as follows, f. o. b. Cleveland, for shipments in the first half of 1903:

Bessemer	$21 85 to 22 35
No. 1 Strong Foundry	22 50 to 23 00
No. 2 Strong Foundry	22 00 to 22 50
No. 3 Foundry	21 25 to 21 75
Scotch No. 1	22 75 to 23 00
Scotch No. 2	22 25 to 22 50
Gray Forge, Valley	20 00 to 20 25
Lake Superior charcoal	23 00 to 24 00

FINISHED MATERIAL.—Very little bar iron is being sold at 1.80c, Youngstown, which is asked by all of the principal producers except one, whose price is 1.85c. Sales of steel bars have been more frequent at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg, but no orders of special importance have been placed. Agreement quotations on structural material are as follows: Beams and channels, 3 to 15 inches, 1.70c; 18 to 24 inches, 1.80c; tees, 1.75c; zees, 1.70c; angles from 3 to 6 inches, 1.70c; universal plates, 1.70c. The demand for structural material is fair with excellent prospects for the summer. Sheets are firmer, but cutting continues, and there is apparently no reason for expecting that the rumored advance in prices will be made. The announced prices of the principal producer for sales through jobbers are as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12-14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75, 10 and 2½ off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.55c to 2.70c; Nos. 18-20, 2.75c to 2.90c; Nos. 22-24, 2.85c to 3c; Nos. 25-26, 2.95c to 3.10c; No. 27, 3.05c to 3.20c; No. 28, 3.15c to 3.30c.

OLD MATERIAL.—Some dealers who sold short on heavy steel are now in the market getting the material with which to fill their contracts. The market is firm and prices stationary. We quote f. o. b. Cleveland, gross tons:

Old iron rails	$25 00 to 26 00
Old steel rails (over 6 feet)	22 00 to 23 00
Old steel rails (6 feet and under)	20 50 to 21 00
Old car wheels	24 50 to 25 00
No. 1 R. R. wrought scrap	22 00 to 22 50
Mill scrap	19 00 to 19 50
No. 1 machine cast scrap	21 00 to 21 50
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	18 00 to 19 00
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	11 00 to 11 50
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	18 00 to 19 00
Grate bars	13 00 to 14 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	18 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 50 to 16 50
Malleable iron (railroad)	19 50 to 20 00

Malleable iron (agricultural)	17 50 to 18 00
Stove plate	16 00 to 17 00
Heavy steel	20 00 to 21 00

CINCINNATI.

March 31.

The market for pig iron is easy and the combination of Southern furnaces has arranged a new schedule of prices for business in the second half of 1903. This schedule is lower than the one agreed to early in January. Coke is coming forward more freely and is a shade lower. Contracts for extended deliveries can be placed at $5.50 f. o. b. ovens, and quick shipment coke can be had at $6 f. o. b. ovens. These prices are for 72-hour foundry coke. Deliveries of pig iron are coming forward more promptly and there is more iron now to be seen in foundry yards. In finished material the market is steady to strong with a quite satisfactory demand.

Pig Iron.—The event of the week was the agreement of the combination of Southern furnaces to lower prices for pig iron for deliveries in the second half of the year. Two sets of quotations were made, one list covering deliveries in territory west of the western termini of the trunk lines, and one for sales in territory east of the western termini. These quotations are not yet officially announced but it is understood they are to go into effect between April 1 and April 10. The figures will be as follows f. o. b. Birmingham:

	For Western Territory.	For Eastern Territory.
No. 1 Silvery	$19 00	$18 00
No. 2 Silvery	18 75	17 75
No. 1 Foundry	18 00	17 00
No. 1 Soft	18 00	17 00
No. 2 Foundry	17 50	16 50
No. 2 Soft	17 50	16 50
No. 3 Foundry	17 00	16 00
No. 4 Foundry	16 50	15 50
Grey Forge	16 00	15 00
Mottled	15 50	14 50
White	15 00	14 00

The $1 per ton differential for Eastern territory was calculated to meet competition on foreign irons. These figures have not become widely public as yet, but they were well enough known by the close of the past week to cause a very ragged condition of affairs in this territory. As the market now stands spot iron is obtainable at $17.25 to $17.50, Birmingham, for No. 2 foundry. For deliveries in the second quarter, $17.25 to $17.50, and for the second half orders can be placed at $17.00 to $17.50, Birmingham, for this grade. There is some adherence to the old quotations of $18.00 to $18.50, Birmingham, but practically no business results. What effect the announcement of these prices will have on the market it is impossible to foretell, but from the way they have been received so far it appears that independent furnaces will not only follow the decline but in some cases shade prices to secure orders. In the meantime the buying movement, so long expected, shows but few signs of making its appearance; and with foundries receiving iron more freely on old contracts, and beginning in some cases to accumulate a noticeable supply in their yards, the announcement of a lower schedule of prices for the second half of the year, it is thought, will incline the buyer to view the situation as so much in his favor that he need not be seriously concerned about his future needs. As the situation appears today the outcome is not easy to forecast. Everything depends upon how the furnaces outside the combination will act. We quote for early delivery f. o. b. Cincinnati:

Southern Foundry No. 1	$21 50 to 22 00
Southern Foundry No. 2	20 75 to 21 25
Southern Foundry No. 3	20 25 to 20 75
Southern Foundry No. 4	19 75 to 20 25
Southern Foundry No. 1, soft	21 50 to 22 00
Southern Foundry No. 2, soft	20 75 to 21 25
Gray Forge	18 75 to 19 25
Northern Foundry No. 1	24 15 to 24 65
Northern Foundry No. 2	23 15 to 23 65
Southern car wheel iron	27 75 to 28 75

Finished Material.—The market maintains a steady to firm tone under continued good demand. Prices show no change. Galvanized sheets are still only quoted upon application and specification. Corrugated iron roofing has advanced 15 cents per square. Everything on the list is steady. We quote today black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.10c; No. 27, 3.20c; No. 16, 2.70c; No. 14, 2.60c; No. 12, 2.50c; No. 10, 2.40c. Tank plates are firm and sell out of store at 2.25c for ¼-inch and 2.35c for 3-16-inch. Beams and channels are quoted at 2¼ to 2¾c from stock, and angles at 2.15c to 2.25c for base sizes. In merchant pipe the market holds steady with a fair demand and schedule prices are maintained. We quote:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜-inch	66.7	56.7	63.7	53.7
½-inch	68.7	58.7	65.7	55.7
¾ to 6-inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½-inch	41.2	35.2
1¾ to 2½-inch	54.2	34.2
2¾ to 5-inch	59.7	44.2
6 to 13-inch	54.2	34.2

Old Material.—No change to note in prices. The market is quiet and steady. We quote:

Old No. 1 wrought railroad, net tons	$18 50 to 19 00
Cast machine and foundry, net tons	17 00 to 17 50
Old iron rails, gross tons	22 50 to 23 00
Old steel rails, gross tons	21 50 to 22 00
Old short lengths, gross tons	17 50 to 18 00
Old iron axles, net tons	27 00 to 27 50
Old chilled car wheels, gross tons	22 00 to 22 50
Stove plate, net tons	11 50 to 12 00
Wrought turnings, net tons	15 50 to 15 75
Cast borings, net tons	12 00 to 12 50

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., March 31.

Pig Iron.—From the standpoint of actual sales the local pig iron market during the week was quiet, but the undertone to it was somewhat stronger. The buying of domestic irons is exclusively made up of small lots to meet immediate requirements. For prompt shipment at Jersey City sellers are asking $24 to $25 for No. 1 Northern; $23 for No. 2 X, and $22.50 for No. 2 plain. Quotations for the same grades for delivery during the last half at the furnace are as follows: No. 1 X, $22.50; No. 2 X, $21.50 to $22; and No. 2 plain, $21. In Southern irons, the best shipment promised is for June, with prices for that time at the furnace quoted as follows, in accordance with the agreement of association furnaces: No. 1, $18.25; No. 2, $17.50; No. 3, $17; and No. 4, $16.50. We know of a sale of 600 tons of No. 2 Southern foundry being made during the week in this market on the basis of $17.50 at the furnace, after the buyer had held out for weeks for $17.40. This gives a good idea of how the furnaces are maintaining their prices. In foreign irons, sales fell off as a general rule. We note the sale of 3,500 tons of German iron at about $21, this delivery, duty paid. German makers are receiving many inquiries for the second half, but are unwilling to close definite contracts, believing that they will get more for their product as the year progresses, chiefly because of the favorable outlook in Continental Europe. Consignees of foreign irons having cargoes arriving here for them find berths scarce and demurrage rates increasing. A cargo of German iron arrived here on Sunday, but the steamer will have to wait until tomorrow (Wednesday) night to dock, and the demurrage will be $125 per day. Middlesboro No. 3 is in good demand, with prices, under the most favorable circumstances, averaging from $18.75 to $19, New York delivery, duty paid. Shipments on old contracts are better, and coke conditions show some improvement. We quote: No. 1 X Northern, $23.25 to $24.25; No. 2 X, $22 to $22.75; No. 2 plain, $21 to $21.75; Southern No. 1 foundry, $23 to $23.50; No. 2 foundry, $20 to $22.50; No. 3 foundry, $21.50 to $22; No. 4 foundry, $20.50 to $21.

Billets.—An exceptionally strong situation has developed in German billets. The best shipment any importer will promise is for June. An urgent buyer could be accommodated before that, but at a price very near the domestic level. At present prices are normal, $29 to $30 being the quotation for Bessemer basic billets, and $30 to $31 for open-hearth billets. New York delivery, duty paid.

Finished Iron and Steel.—Railroads were conspicuous in the structural material market during the past week, especially in providing for their bridge requirements. In this connection

the American Bridge Co. closed the following contracts: 5,000 tons with the Pennsylvania Railroad Co.; 3,800 tons with the Atchison, Topeka and Santa Fe Railroad Co.; 3,000 tons with the Missouri Pacific Railroad Co.; 1,000 tons with the Pittsburg, Carnegie & Western Railroad; and 900 tons with the St. Louis Terminal. Other orders booked by the same company were as follows: 5,000 tons for the new shops of the Pennsylvania Railroad Co., at Altoona, Pa., and 900 tons for bridge work in China, the latter being the largest single export order the company has received in many months. The company reports a continuance of its operations in all parts of the country, with the exception of New York, Buffalo, and Schenectady. It expects to resume work in the latter city in a day or so. The company says it is experiencing no difficulty in getting men to take the place of the strikers and looks for an early surrender of the latter in consequence. The sheet market is notable for the heavy demand for galvanized sheets, and the refusal of some of the largest jobbers to allow any discount. Black sheets are now quoted at 3.05c to 3.10c for No. 28, the latter price being that of jobbers. There are no new developments of fresh interest to note in plates and bars, beyond what has previously been enumerated. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 2.50c; refined iron bars, 1.95c to 2.10c; soft steel bars, 1.95c to 2.10c; steel sheets, in carloads, New York, No. 28 black, 3.05c to 3.10c; galvanized, 75 and 2½ off to 75 straight.

ST. LOUIS.

March 31.

All the activity during the past week in review has been confined to tubular goods, the business in which can be conservatively stated as very large. In the pig iron market the consumers have been waiting for concessions in southern iron. The marked impetus in tubular lines has caused jobbers to prepare for an advance in merchant pipe. Transportation problems are still troublesome and the various aggravations in the Eastern situation have added to the difficulties that are now bothering the pig iron men who have iron consigned them by river routes. The floods have played havoc with shipments in many cases.

PIG IRON.—Inquiries on the average of weeks past; sales few and restricted to small lots; consumers are holding off; and the car problem as deep as ever is a summary of pig iron conditions. Agents are a unit on but one thing and that is that the buying movement must come. At the present time consumers of this section have about 10 percent of their requirements for the second half covered. Coke has been dribbling in small lots and price is governed by day by day fluctuations. The average price of Connellsville grades at East St. Louis runs from $10 to $12, Virginia $9 to $11. We quote pig iron prices as follows: No. 1 foundry and soft, $23.75 to $24.25; No. 2 foundry and soft, $23 to $23.75; No. 2 foundry and soft, $22 to $22.50; gray forge, $20 to $21.

FINISHED MATERIAL.—The week has been quiet in structural material so far as new business is concerned, yet the tonnage and specifications on old contracts are coming in splendid shape. No large contracts have been let during the past two weeks. There is no cessation in the demand for bars which are quoted at 1.85c mill and from 2.15c to 2.25c out of store according to size of order. Spring business in some lines of merchant material is backward owing to unsettled weather conditions in territory drained by this market. The 2.40c base is still the standard for angles and channels. Prices for plates f. o. b. St. Louis long time or hazardous delivery, tank ¼ inch and heavier, 1.80c to 2c. Sheets are in demand and the upward tendency of the price has left many in the dark as to the final culmination of the present conditions. Jobbers are asking from 3.15c to 3.25c for 27 gauge black. Large hardware interests are getting from 2.20c to 2.25c for carload lots of wire nails.

TUBULAR GOODS.—The week past has brought forth what might be called an enormous business in this territory. Municipal contracts were placed calling for $250,000 worth of water pipe. The United States Cast Pipe & Foundry Co. was awarded one contract for 4,525 tons. This order it duplicated on a M'Allister, Okla., contract. The National Tube Co. placed one order of 2,500 tons and many others of lesser tonnage. If the activity continues, and there is every indication that it will, the price in all lines is expected to stiffen. Deliveries are brighter.

OLD MATERIAL.—Sharp trading continues and all dealers report remarkable business. Railroads are slow to sell their material and scarcity in some lines is threatening to interests of some foundries and mills. We quote dealers' selling price f. o. b. East St. Louis:

GROSS TONS.	
Iron rails	$26 00 to 28 80
Heavy melting steel scrap	20 50 to 21 50
Mixed steel	18 50
Heavy relaying rails	32 00
No. 1 railroad wrought	21 00 to 21 75
Shafting	22 50
Iron axle turnings	16 50
Cast borings	12 00
No. 1 boilers, cut	15 00
Heavy cast scrap	18 00
Stove plate	13 00
Railroad malleable	16 00
Iron axle turnings	16 00
Busheling scrap	17 00

METALS.—It is almost impossible to procure spelter for delivery after May 1. Prohibitive figures are asked for immediate delivery. Sales are being made all the way from 5.40c to 5.80c. Lead is firm at 4.57½c.

PHILADELPHIA.

March 31.

Labor appears to be in a more reasonable mood in this city and vicinity and while the money market is not all that might be desired, conditions in general are favorable for a good summer trade. Prices are steady with sales that amount to a fair volume. Fuel conditions are much better.

PIG IRON.—There is little change in the situation, some grades being more active while others are not. The heavy sales of basic made early in the month have been followed by a very dull market for that kind of iron. Foundry iron is more in demand, but there is not much inquiry for the second half. For heavy tonnage for the last six months, the tendency is to make slight concessions. Foreign iron is not so important a factor as it was a few weeks ago, as prices are advancing and there is not much profit for importers. Local furnaces are working well. We quote as follows: No. 1 X foundry, $23.50 to $24; No. 2 X foundry, $22 to $22.50; No. 2 plain, $21.50 to $22; gray forge, $19.50 to $20.50; Middlesboro No. 3, $21 to $21.50; Scotch, $22.50 to $23.50; basic, $19.75 to $20.50.

BILLETS AND MUCK BAR.—Steel is scarce and it is very difficult to get prompt deliveries. The prices are $32.50 to $33.50 for American and $28.50 to $29 for German. Eastern makers ask $35 for muck bars at makers' mills.

FINISHED MATERIAL.—There is a good demand for plates and sheets and a fair business is being done in structural material. Bars are not very active. We quote as follows: Plates, in small lots, 2.10c to 2.15c; carload lots, ¼-inch and thicker, 1.90c to 1.95c; universals, 1.95c; flange, 2.10c to 2.20c; firebox, 2.25c to 2.30c; marine, 2.30c to 2.35c. Steel bars, 1.80c to 1.90c; prompt shipments from local mills, Western steel, 1.75c to 1.80c; bar iron, 1.93½c to 1.98½c. Structural material in small sizes is quoted 1.73½c to 1.80c; large sizes, 1.90c to 2.10c.

OLD MATERIAL.—Scrap is scarce but at present prices there is all the material needed. We quote: Old steel rails, $21.50 to $22; miscellaneous heavy steel scrap, $20.75 to $21.25; low phosphorus scrap, $26.50 to $27.50; old steel axles, $27 to $28; old iron axles, $30 to $31; old iron rails, $25 to $26; old car wheels, $24.50 to $25.50; choice scrap RR. No. 1 wrought, $23.50 to $24; country scrap, $20.50 to $21.50; machinery cast, $19.50 to $20.50; No. 2 light scrap (forge), $17.50 to $18; No. 2 light scrap (ordinary), $14.50 to $15.50; wrought turnings, $16.25 to $16.50; wrought turnings, choice heavy, $16.75 to $17.25; cast borings, $11.50 to $12; stove plate, $16 to $17.

BIRMINGHAM, ALA.

March 31.

For some ten days there has been a very good inquiry, but not a great deal of business has been done. Some sales have been made at $17.50 for No. 2 foundry, the new

price agreed upon by the southern association furnaces last week. No. 4 foundry, gray forge and mottled have until recently been held on practically the same basis. It now seems as though the usual difference of fifty cents per ton between these grades will gradually become effective, as the consumers of forge and mottled insist that they are relatively too high. Such being the case, with No. 2 foundry at $17.50 Birmingham, the price for gray forge would be $16.00, with mottled $15.50. In order to meet the competition with foreign iron, it is generally understood that in the Pittsburg and Eastern markets some sellers have been shading recent prices as much as one dollar per ton.

Production continues at about the same rate as for the past several months. The Woodward Iron Co. has one stack out of commission, and in the meantime, is building an entirely new stack, to have a capacity of 300 tons daily. It has recently bought three large blowing engines for this new furnace. The Republic Iron & Steel Co. will put out this week one of its stacks at Thomas, Ala. The new stack of the Alabama Consolidated Coal & Iron Co. will soon go in commission, but as soon as it is blown in the old stack will be put out for general overhauling and improvement. The new stack of the Central Iron & Coal Co. will not go in commission for some time. There is a probability of the Trussville furnace being blown out soon for overhauling. It is stated, however, that it may continue in operation until July 1. The Woodstock Iron Works has one furnace out at this time. So, as fast as a new furnace comes in, the increase in output thereby is offset by another going out for repairs. The Lookout Mountain Co. is putting in foundation for one furnace and expects to have it completed in about ten months.

Coke is in some better supply, with prices slightly lower. Contracts for the last half of the year are being made for furnace and foundry use at from $5.00 to $5.75, f. o. b. ovens. Coal is also much easier, though the question of car supply continues to be the chief factor in that respect. Several new coal companies have organized recently, and some of them propose to begin operations at an early date. The proposed extension of the Birmingham Mineral railroad from Altoona to Attalla, Ala., to connect with the Alabama Mineral division of the L. & N. system, will open up a rich coal field and some valuable ore properties. This territory is now the center of attraction in real estate circles, and some valuable properties are being taken in by strong companies.

All the foundries and machine shops in the Birmingham district are running full force, and a number of them continue to run overtime. Supplies of raw material are regular and constant. Construction work of all kinds still drags because of the excessive rains. The rainfall the past three months has been enormous.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM NO. 1909, 150 NASSAU ST. March 31.

PIG TIN.—As compared with the week previous, the market during the past week was higher by nearly 100 points. The bullish interests in the market derived the greatest satisfaction from the results of the Banca sale on last Thursday, when about 3,000 tons brought considerably higher prices than were anticipated. London then began buying, and values scored an advance of over £3 the following day, but since then prices have been well maintained. The demand has been very unsatisfactory, indicating that consumers have pretty well covered their wants. The monthly statistics compiled by Secretary D. Mayer, of the Metal Exchange, which will be promulgated tomorrow, will show stocks on hand on April 1 in the United States to be 5,295 tons, with 5,134 tons afloat. This forms the biggest visible supply the country has ever known, and at the present rate of consumption will last until the end of June. The arrivals for March aggregated 4,753 tons, the largest for any month since 1899. Closing prices at the Metal Exchange today were as follows: Spot to June, 30¼c to 30¾c. London's closings today follow: Spot, £139 12s 6d; futures, £139 15s.

COPPER.—The metal has been extremely dull, consumers holding aloof from the market, pending the Wall St. influences that characterize it. The buying has been on the most restricted scale noted in weeks. The trade situation continues to evoke unfavorable comment from those on the spot, with Wall St. occupying the anomalous position of pronouncing it of the best, while copper shares show a net decline of 6½ points for the week. The price of the metal is of the nominal order, and shows little or no change from previous quotations we have given. The London market displayed a reactionary tendency during the week, with prices lower by nearly £2, and with closing prices for both spot and futures today £63 15s. This has not happened before in weeks. Closing prices at the Metal Exchange today were as follows: Lake and electrolytic, 14¾c to 15c; casting, 14½c to 15c; standard, 13¾c—all nominal. Exports for the month amount to 12,172, which is 7,000 tons below those for March last year.

LEAD.—Lots of 50 tons or more sell at 4.67½c. St. Louis is unchanged at 4.60c. London during the week declined 17s 6d from the highest, and closed weaker today at £12 17s 6d.

SPELTER.—Supplies are meagre, and the market is a trifle stronger at 5.75c. St. Louis is firm at 5.35c. London is a little stronger at £23 5s.

ANTIMONY.—Is unchanged. Cookson's is 8¼c to 8½c; Hallett's, 6¾c to 6¾c; and other brands, 6⅝c to 6¾c.

NICKEL.—Large lots can be had at from 40c to 50c, and smaller lots at from 50c to 60c.

QUICKSILVER.—Sales have been made on the basis of $47 per flask in lots of 100 flasks. London, £18 12s 6d.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, March 31.

The metal market is strong, prices being firm and of an advancing tendency. Copper shows occasional reactions, but is without material change in prices. Tin is quiet, but spelter and lead are in good demand. We quote lake copper, carload lots, 15c; smaller quantities, 15¼. Pig lead, 4.50c in 50-ton lots, and 4.62c in carload lots. Pig tin, 33c. Spelter, 5½c carload lots, and 5¾c for lesser quantities. Sheet zinc, 6¼c to 6½c for lots over 600 pounds. Antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's in small quantities. Old metals are also strong. We quote, copper wire, $13; heavy copper, $12.50; light copper, $12; red brass, $11.50; yellow brass, $10; light brass, $8.50; lead pipe, $4.10; zinc, $4.10.

Personal.

John Lewis, assistant master mechanic at the Shenango plant of the National Steel Co., New Castle, Pa., has resigned. His successor has not yet been appointed.

William Taylor, formerly connected with the H. C. Frick Coke Co. at the Leith plant, has purchased the interest of I. H. Brownfield in the Masontown Coal & Coke Co., Masontown, Pa., and has been made manager of the plant.

Fred W. Bauer, for several years connected with the Carnegie Steel Co.'s Cincinnati office, and later with the Star Furnace Co., Jackson, O., accepted a position with Rogers, Brown & Co. on April 1.

R. McCarty, manager of the Bignall & Keeler Mfg. Co., Edwardsville, Ill., has resigned, the change taking effect April 1. He becomes manager of the Stoever Foundry & Mfg. Co., Myerstown, Pa., a position to which he brings large experience and a valuable acquaintance.

A New Plate Mill Record.

(Special Telegram.)

PITTSBURG, April 1.—During the 12-hour day turn yesterday the 128-inch mill of the Homestead works of the Carnegie Steel Co. produced 550 tons of finished plates. The best previous record for the day turn was 493 tons.

J. N. Elliott, Jr., who recently purchased a furnace at St. Louis and moved it to Gadsden, Ala., informs us that he has not, as reported in daily newspapers, made arrangements to build a second furnace at Gadsden.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

APRIL 2, 1903

A YEAR OF SOLID GROWTH.

In the first issue in April, 1902, *The Iron Trade Review* announced its intention to give greater prominence in its reading columns to matters of interest to machinery manufacturers and machinery users. It was proposed, as one feature of this program, to make the first issue of each month considerably larger than the ordinary issues, and without diminishing the amount of reading matter devoted to the iron and steel works and foundry interests, to pay special attention to topics important to the machine tool and general machinery trades. It was pointed out in the announcement of one year ago that while the field of shop practice on the mechanic's side, and of details of machine construction, was covered by ably conducted journals, there was call for such treatment of machinery manufacturing, selling and using as would appeal particularly to the proprietor, superintendent and manager. The record of the year has more than realized the expectation of the editors and publishers. The response in subscriptions and advertising indicates marked appreciation of our purpose to fill a field not covered in this way by any trade publication. The matter presented in our Machinery Numbers of the past year—and appearing in increasing volume in the intervening issues of the paper—has appealed to a large and steadily growing constituency. An examination of the nearly 600 reading pages of these Machinery Numbers will show that the promises of one year ago have been more than kept. The man in the office, whose interest is in questions of administration, shop accounting, of buying and selling, of wages and labor conditions, and in movements among employers and employes, has found in *The Iron Trade Review* a notable variety of material of working value to those who have in their hands the conduct of our vast metal-working industries.

The constituency of *The Iron Trade Review* among machinery manufacturers which had been much increased prior to April 1, 1902, has been multiplying rapidly in the past year, and under the strong subscription campaign continuously in progress we can safely predict its substantial enlargement in the year to come. In our announcement of one year ago it was stated that the initial issue represented the minimum size of the Monthly Numbers. An increase from 100 pages at that time to 158 pages today is a gratifying exhibit in substantiation of that promise.

FIRST AID IN SHOP ACCIDENTS.

On other pages of this issue is a description of the manner in which some notable shops have met the demand for first aid to the injured. These are to be followed by other examples of equal interest and value, in contributing to a better knowledge of a subject upon which there is a variety of opinion and practice. There is the firm that wishes to do enough and may attempt too much; there is also the company that is uncertain about the need, and is apt to accomplish nothing. It is possible by attempting too much to make the work a burden upon those charged with it and expensive out of all proportion to the actual need. The use of drugs by those not thoroughly informed is always dangerous. For example, as is pointed out in the article, the increasing fondness for applying a solution of cocaine for the very frequent machine shop troubles with the eyes (from the lodgment of chips), and the opportunity for the workman to work upon his neighbor's eye with the greater freedom of the anæsthetic may readily encourage an excess of surgical ambition.

There is another side to the question, however, and it relates to prevention. Every passenger train on the railroad carries saws, axes, bars, etc., for extricating the unfortunate in the event of a wreck; but there seems to be a lack of training of a systematic character for suitable first aid to the injured or supplies for that purpose. Our police and firemen are almost inseparable from scenes of accident, yet the same condition holds. The control of ambulance service in many large cities is in the hands of private firms whose employes have but a meager knowledge of first aid rules. There is in these directions a promising field for the "Red Cross" movement, the efforts of the Y. M. C. A. and the influence of the casualty companies. Something is being done, as intimated in the letter we print from the Brown & Sharpe Mfg. Co., and a more extensive movement is at present under consideration.

The point has been raised that workmen will forget instructions on account of the few chances they have to apply their knowledge, but the memory may be stimulated by occasional drills and examinations. Granted a national movement with certificates for proficiency and it is likely that the workman holding such a recommendation would find he had a valuable wage earning asset. There is no question that the casualty companies would endorse such a movement heartily.

Aside from a well trained force is the question of supplies—the tools as well as the workmen are of importance. The letters we publish this week and those yet to appear will go far toward a solution of the question of a standard equipment, and the exact form this should take may for the present be left for further discussion. Manifestly the emergency case should be in easily handled form, without lock and conveniently placed. A brief and simple form of instructions should

be printed on the case and in more readily handled form generally distributed in the shop. With a simple litter, these conveniences would make an outfit suitable for any plant, the extent of the equipment varying with the size of the works. The end in view is the simplest tools and methods, something not burdensome for the average concern and easily understood.

The drill need not be of a complicated character. Such surgery as would be advisable in this way is purely mechanical, and the temporary choking of an artery or vein would require a very limited knowledge. To locate the best point at which pressure can be brought on the passage and against a supporting bone, to take care that the bandage is not allowed to strangle the limb—such things are easily taught and but seldom required. The whole question of drill can be resolved into so few items of importance that it seems likely it will some day be taught at the schools.

Undertaken on simple and effective lines the matter is worth the consideration of manufacturers, both as a business proposition that looks to the conduct of shop work with a minimum of interruption and annoyance—something analogous to good light, fresh air, high-duty steel, etc.—and the humane provision against undue suffering and jeopardy to life.

LARGE DECREASE IN IRON AND STEEL IMPORTS.

The most interesting feature of the imports of iron and steel for February as reported by the Treasury Department is the decline in the imports of pig iron, which were only 45,187 tons, as compared with 110,679 tons in January and 118,373 tons last December. The imports of pig iron were less than for any month since last June, when they were 32,258. In July, the heavy imports set in, the record for that month being 62,106 tons. From July until February there was a steady increase with the exception of October, in which month the imports fell below those of September by 14,992 tons. The imports of steel for February also show a large decrease, being only 20,151 tons against 38,691 in January, and being smaller than for any month since last April, when they were 13,005 tons, rising to 24,388 tons in May. The imports of scrap have decreased from 12,802 tons in January to 4,250 in February, while bar iron shows a decrease from 7,277 tons to 2,646. Imports of iron and steel rails have increased from 5,405 tons in January to 19,804 tons in February, showing that the tremendous demand of the railroads for rails has caused the purchase of a large tonnage in Europe. Imports of sheets and plates have fallen from 1,744 tons in January to 206 tons in February. The total imports for February are 97,863 tons against 184,101 tons in January. The following table gives the imports for February and for the eight months ending with February:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	February		Eight Months Ending February	
	1902.	1903.	1902.	1903.
Pig iron	8,307	45,187	59,544	665,642
Scrap	750	4,250	17,276	90,617
Bar iron	2,276	2,646	17,256	30,459
Iron and steel rails	346	19,804	2,090	75,009
Hoop, band or scroll	30	117	3,540	1,062
Steel ingots, slabs, billets or bars	2,235	20,151	11,899	262,105
Sheets and plates	973	206	5,847	5,508
Tin and terne plates	6,216	4,026	65,586	32,914
Wire rods	828	1,224	10,578	15,698
Wire and wire articles	236	252	2,833	2,039
Total	22,197	97,863	196,449	1,181,053

The total value of iron and steel imports for February, not including ore, but including some manufactures of iron and steel not given in the above table, is $3,312,074 against $1,768,305 in February, 1902. In the eight months, the totals were: $34,558,054 in 1903 and $15,727,934 in 1902. Iron ore imports in February were 64,378 tons against 148,210 tons in January, 1903, and 73,506 tons in February, 1902. In the eight months, the imports of ore were: 1903, 715,828 tons; 1902, 745,364 tons.

Exports have increased somewhat, being 21,726 tons in February as compared with 17,455 in January, but they are still far below the exports for 1902. In February, gains were made in exports of wire rods, steel bars, iron rails, and billets, ingots and blooms and structural material as compared with January. For the month the value of exports, not including ore, but including manufactured articles not named in these tables, was $6,923,205 in 1903 and $7,365,395 in 1902; for the eight months the values were: 1902, $64,675,523; 1903, $62,921,147. In spite of the heavy increase of imports and decrease of exports during the past eight months, the value of our exports in that period exceeded that of the imports by $28,363,093. The values of leading exports were as follows in the eight months ending February, 1903: wire rods, $660,208; steel bars (not wire rods), $556,513; steel rails, $588,061; structural iron and steel, $1,371,559; wire, $3,122,033; builders' hardware, $4,819,007; other tools, $2,648,666; castings, $1,238,481; firearms, $667,271; cash registers, $868,103; pipes and fittings, $3,370,625; electrical machinery, $4,084,471; stoves and ranges, $625,742; metal working machinery, $1,814,744; pumps and pumping machinery, $1,820,554; sewing machines, $3,177,948; locomotives, $2,504,264; boilers and parts of engines, $1,755,536; typewriters, $2,402,767. The following table gives the exports for the articles named:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	February		Eight Months Ending February	
	1902.	1903.	1902.	1903.
Pig iron	2,463	876	47,654	13,048
Scrap	1,328	197	9,786	4,120
Bar iron	386	267	6,494	6,658
Wire rods	159	1,416	5,529	19,390
Steel bars (not wire rods)	1,076	3,670	12,925	9,815
Iron rails	4	357	600	402
Steel rails	6,202	168	138,741	19,414
Billets, ingots and blooms	88	317	2,327	1,829
Hoop, band and scroll iron	133	96	1,158	775
Iron sheets and plates	282	102	3,099	1,892
Steel sheets and plates	307	808	5,744	8,242
Tin plates, terne plates and taggers tin	215	25	396	650
Structural material	10,081	3,114	39,295	19,691
Wire	7,446	7,646	62,418	60,009
Cut nails	498	775	4,070	4,455
Wire nails	1,677	1,765	11,629	17,757
Other nails, including tacks	206	127	1,297	1,658
Total	32,551	21,726	353,162	189,805

THE STEEL CORPORATION'S BONDS.

There has been considerable discussion in the iron trade as to the relative value of various bonds issued or guaranteed by the United States Steel Corporation, the discussion being prompted by the fact that the trust companies which underwrote a portion of the Union Steel bonds offered them at 101 and accrued interest, while on the "curb" the new U. S. Steel bonds sold at the same time at from 87 to 88 and have since declined to between 85 and 86. Such discussions have led to no accepted conclusion, for the simple reason that no conclusion is possible in the premises. The bonds and bond obligations of the steel corporation are as follows:

(1) Bonds of various subsidiary companies owned by the public, and having a lien prior to corporation bonds, on such individual properties.

(2) An issue of $304,000,000 50-year 5 percent gold bonds, secured by a deposit with a trust company of the stocks of subsidiary companies and the bonds of the Carnegie Co. Of this amount $303,757,000 had been issued at last account. Andrew Carnegie received approximately $240,000,000 of these bonds, for his 60 percent stock and bond holdings in the Carnegie Co., the balance going for other Carnegie Co. bonds.

(3) The second mortgage 5 percent 60-year gold bonds, $250,000,000 being authorized but not yet issued.

(4) The $45,000,000 5 percent sinking fund 50-year gold bonds, issued by the Union Steel Co., constituting a first mortgage on the Union-Sharon properties, guaranteed principal and interest by the steel corporation. In case all the old Sharon bonds were not turned in, the total issue would be diminished in proportion, the remainder constituting a lien secondary to the Sharon bonds outstanding, as relates to the Sharon properties.

The rank of the first two classes of bonds is plain. Bonds of the first class constitute a first lien on the respective properties against which they were issued. The bonds of the second class constitute a second lien against properties which have bonds of the first class against them, and a first lien on the balance.

As between the third and fourth classes, the relative rank is one not now definable categorically. It would be determined, in the event of embarrassment, by the methods of administration of the corporation's business at the time. The bonds in class 4 are issued by the Union Steel Co., a Pennsylvania corporation, the stock of which is, purely incidentally, owned by the steel corporation. The company can be operated independently, buying and selling as its officers and directors choose, or the plants can be operated by steel corporation subsidiaries under lease or otherwise. So long as the Union Steel Co. pays interest on the bonds, and contributes to the sinking fund, no question can be raised by bondholders. The company might be earning profits permitting this when the steel corporation was unable to pay interest on its own bonds, or it might fail to do so while the steel corporation was making handsome profits.

That the Union bonds constitute a first lien on the Union-Sharon properties is of practically no consequence. A disturbance in the trade so serious as to impair the security of the corporation second mortgage bonds would make the Union-Sharon properties of comparatively small marketable value.

The discrepancy between the apparent values of these two classes of bonds is clearly one of stock market exigencies, and not one of actual worth to one who intends to hold such bonds permanently as an investment.

An explosion which occurred at Furnace I of the Edgar Thomson plant March 31 resulted in the death of six men. Eleven others received terrible burns.

The rebuilt furnace of the Penn Iron & Coal Co., at Canal Dover, O., was blown in on March 23. This plant was reconstructed under the designs of Frank C. Roberts & Co., Philadelphia.

MAHONING AND SHENANGO VALLEY OUTPUT.

Industries, of Youngstown, O., has collected statistics of production and of material handled by the furnaces, steel works and rolling mills in the Mahoning and Shenango Valleys in 1902. The points included are Warren, Niles, Girard, Youngstown, Struthers, Lowellville, Hubbard, Wheatland, South Sharon, Sharon, Sharpsville, West Middlesex and New Castle. The 32 blast furnaces in the two Valleys produced 2,604,344 tons according to these statistics. The figures of the American Iron and Steel Association, published in January, show a total of 2,693,020 for the two Valleys. The difference might be due to the inclusion of the output of the two furnaces at Leetonia in the association's figures for the Mahoning Valley; yet these two furnaces no doubt produced more than this difference would represent. The receipts of material at the blast furnaces of the two Valleys are stated as follows:

Ore	7,604,071	gross tons
Cinder	34,342	gross tons
Coke	2,827,973	net tons
Slack and coal	205,476	net tons
Limestone	1,334,643	net tons
Sand	108,211	net tons

The production of rolling mills and Bessemer and open-hearth steel plants is represented in the following statement, of which the total is omitted, owing to the duplication of intermediate and finished material and to the fact that some of the figures are doubtless in gross tons, while others are in net tons:

Muck bar	215,110	tons
Skelp and plates	13,583	tons
Billets	584,955	tons
Tin bar	100,110	tons
Sheet bar	265,259	tons
Bars, iron and steel	423,229	tons
Hoops, bands and cotton ties	147,232	tons
Sheets, black and galvanized	86,223	tons
Wire (barb and plain)	54,816	tons
Wire nails	739,639	tons
Rails	325,000	tons
Pipes and tubing	39,513	tons
Ingots and blooms	1,599,699	tons
Wire rods	77,316	tons
Scrap	79,698	tons
Tin plate	77,500	tons

The Steel Corporations Pocahontas Coke Operations.

Reference was made in last week's issue to the expected starting up of ovens at the United States Steel Corporation's properties in West Virginia, close to the Virginia line. We are now informed that only about 50 ovens of the 1,500 projected are finished and it will be late in the year before any considerable output of coke will be possible. A fire brick plant of the corporation has just been started at Abbs Valley, Tazewell Co., Va., and the corporation will manufacture fire brick for its own ovens. A special process of treating the clay has been evolved from laboratory work. It is announced that no brick for the trade will be produced at these works for at least three years.

The Jenison Iron & Engineering Works, Grand Rapids and Jenison, Mich., whose plant at Jenison was entirely destroyed by fire March 21, sustained a loss approximating $40,000, partially insured. The company intends to resume operations as soon as a plant can be found or built, and is now looking for a suitable location in Grand Rapids or elsewhere, which will enable it to get started quickly. It will be in the market for a number of iron working machines as well as some wood working machinery for its wood split pulley department, and will also require full foundry outfit.

The Ohio Steel & Iron Specialty Co., of Cuyahoga Falls, O., after a period of repairing and new installation, has started up its furnaces and is now ready to roll refined bars and merchant bar iron. These products are in addition to the company's original lines of angle and tee irons, channels and light shapes.

Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1061 ROSE BUILDING, April 1.

Activity, which was so marked among Cleveland manufacturers in January and February, continued throughout March and there are no indications that orders will decrease at any time in the near future. The demand for automobile parts and for railway supplies is unprecedented and an increase of the capacity of a number of plants will be necessary. There is not much building in progress at present, but work on a number of additions will begin this month. Among the structures recently erected is the machine shops of the Reade Machinery Co., at Collinwood, a suburb of Cleveland.

The Horsburg Forging Co. has let the contract for a new forge and machine shop, which will be 50x100 feet, one story, with slate and gravel roof.

The Cleveland Steam Fitting & Supply Co. has obtained the contract for the pipe fitting for the power plant at the C. & P. R. R. ore docks on Whisky Island. Hoover & Mason, of Chicago, have the general contract.

John R. Kendrick, acting commissioner general of the department of manufacturers of the St. Louis Exposition, is now in Cleveland conferring with manufacturers who intend to make exhibits. It is expected that many extensive manufacturing concerns will be represented in a creditable manner.

The Cleveland Twist Drill Co. is moving machinery into its new addition, which is 50x140 feet, three stories and basement.

Jos. Dyson & Sons are installing two steam hammers and several lathes in their new addition.

The Cleveland Wire Spring Co. now occupies its new addition. This company will soon have on the market a new steel truck for handling steel barrels used in foundries and machine shops.

The Cleveland Dental Mfg. Co. is erecting a building for the manufacture of all kinds of dental instruments. It will be three stories, 76x150 feet.

The Globe Machine & Stamping Co., 970 Hamilton St., reports that its sales of improved oblique tumbling barrels have been very encouraging. Besides others, the company has made recent sales to the following prominent concerns: Western Electric Co., Chicago; Leland & Faulconer Mfg. Co., of Detroit; Cleveland Wire Spring Co., of Cleveland, and the American Waltham Watch Co., of Waltham, Mass. The sales of sensitive drill presses during March have also been good. The Globe people have added another floor, 50x100 feet, in order to increase their facilities for manufacturing their various specialties. They also make drop forging dies, sheet metal working dies of all kinds, special stampings, and are doing automobile work for various concerns.

The Osborn Engineering Co. has charge of the remodeling and redesigning of the new plant being constructed by the Riverside Foundry Works. Contracts have already been let and it is expected that foundry will be ready for operation in a short time.

The National-Acme Mfg. Co. reports that the volume of business for March has been most satisfactory. It has been the banner month, even prior to the close, for machinery sales both for foreign shipment and domestic.

The Brown Hoisting Machinery Co. has secured a contract for a large coal handling plant, which is to be shipped to Wakamatsu, Japan.

The Ajax Elevator & Machine Co. has plenty of business and is figuring on a large amount of work.

F. H. Bultman & Co. have enough orders to keep them busy for six months.

The C. O. Bartlett & Snow Co. reports that it finds that prices of iron and steel seem to be a little on the decline and coal is very much lower, run of mine coal being offered at $1.90 per ton f. o. b. cars Cleveland. This company is very busy especially in building dryers. It has lately received orders for dryers from Wood & Swart, Denver, Col., also the Aetna Powder Co., Chicago, and the Charles Mill Supply Co., New York City. It is also busy in the line of elevating and conveying machinery.

The Reliance Gauge Column Co. is not contemplating enlarging its plant at the present time, although it would be well warranted in doing so on account of the many large rush orders it is receiving. Business remains very good and up to this date it has been unable to make shipments as fast as orders are received.

The Columbian Hardware Co. will soon move into its new building. The Osborn Engineering Co. did the engineering work.

T. A. Aiton, general manager of the Otto Weiss Machine Co., of New York and Berlin, has been in Cleveland for the past fortnight, completing arrangements with the Chase Machine Co. for the latter firm to manufacture its extensive line of cable winding, twisting, stranding, insulating and other machinery.

The Cleveland Foundry Co. is making alterations to its plant. Plans were prepared by the Osborn Engineering Co.

The Acme Machinery Co. advises that it finds present business conditions very satisfactory and the outlook for a continuance particularly in its line is very encouraging for this year. The company is receiving a large number of orders daily and is running its plant full force.

Foote, Burt & Co. find that the tendency of buyers is to heavier types of drills. Last week they shipped two large machines to the C. M. & St. P. R. R. and one to the American Hoist & Derrick Co., Minneapolis.

The Standard Welding Co. has an unusual opportunity of feeling the pulse of the trade, owing to the various articles that are either formed or forged or turned, then to be electrically welded. These indications are to the effect that this busy season will continue for at least six months or one year. The demand for automobile material is equal to the capacity of the united producers of material and fitting. Present indications would determine that at least 30,000 automobiles will be built within the next twelve months, all on a conservative basis covering a range and capacity of automobiles from runabouts to touring cars, and the advance that is being made in the way of building horseless trucks would indicate that this will be an immense industry.

Obituary.

George Singer, Jr., formerly treasurer of the firm of Singer, Nimick & Co., which was absorbed by the Crucible Steel Co. of America, passed away at his home in Pittsburg on Friday, March 27. With his brother, W. H. Singer, he was instrumental in organizing the firm of which he was treasurer for many years, retiring from active business when the concern was taken into the Crucible Steel Co. of America. He is survived by two children, Harry and Louise.

Geo. D. Haworth, a manufacturer of Decatur, Ill., and inventor of the corn planter and other agricultural implements, died at his home March 24. Mr. Haworth was born in Clinton County, O., in 1833, but had lived in Illinois since 1853, in which year he invented and manufactured his first corn planter. This invention was the basis of his fortune.

William McDonald, who founded the Lapeer Steam Engine Works, and who was until recently its manager, died at his home in Lapeer, Mich., March 23, aged 84 years.

Wm. Chisholm Stubbs, treasurer of the Struthers Furnace Co., Cleveland, died at his home March 31 after an illness of five days of pneumonia. He was taken sick while visiting the furnace at Struthers March 25. Mr. Stubbs was 31 years of age and leaves a widow and three children. He was born in Chicago, where he graduated from the high school and manual training school and then engaged in the coal business until two years ago, when he came to Cleveland to be associated with his father, President J. B. Stubbs, of the Struthers Furnace Co. Mr. and Mrs. J. B. Stubbs were in California at the time of their son's death, but arrived in Cleveland April 2 to attend the funeral.

Announcement is made by S. Diescher & Sons, mechanical and civil engineers, Pittsburg, of their removal from 713-15 Hamilton Building to 1503-6 Farmers' Bank Building.

The Bassett-Presley Co., Cleveland, now occupies its new warehouse on Clifton St. The building is 360x165 feet, two stories, and has all the appointments of an up-to-date warehouse.

National Metal Trades Association.

(Special Telegram.)

BUFFALO, N. Y., April 1.—The fifth annual convention of the National Metal Trades Association, which began a two days' meeting at the Hotel Iroquois today, is one of the most important in the association's history. It has gained greatly in membership and influence in the past year, and the present convention is expected to lay broad plans for the extension of the work. Local organizations affiliated with the National body are multiplying and employers in the metal working trades are realizing as never before the necessity for association effort in handling the questions confronting them with the recent rapid growth of trades unions.

The convention was called to order this morning by Commissioner E. F. Du Brul, in the temporary absence of President Watkins. Geo. F. Steedman, of the Curtis & Co. Mfg. Co., St. Louis, formerly president of the association, was made chairman.

The nominating committee previously appointed by the president, and consisting of Messrs. M. H. Barker, of Boston, H. N. Covell, of New York, and Hobart, was confirmed by the convention and the following committees were announced:

Auditing Committee—Messrs. P. B. Kendig, Seneca Falls, N. Y.; E. P. Robinson, Boston; R. H. Jeffrey, Columbus.

Press Committee—Secretary Robert Wuest.

Committee on Resolutions—Messrs. O. P. Briggs, Minneapolis; F. B. Polson, Toronto; D. D. Russell, Boston, and Burkitt.

The reports of President Watkins, Commissioner Du Brul and Secretary Wuest were read. All were most encouraging and were enthusiastically received.

Commissioner's Report.

The report of Commissioner Du Brul, reviewing the work of his office in the past year, was a comprehensive document giving an excellent idea of the scope of the association's activities and pointing out the lines on which its future efforts will be most effective. The publication and scattering of printed matter relating to the association's work and to the questions now pressing upon manufacturers in the metal-working trades, has been one of the most important features of the past year's campaign. The commissioner notes that at the beginning of the official year there was a complaint that not enough information as to the association's work was being disseminated. This condition he says has been remedied, possibly to the extreme of sending out too much literature. In any case, the interest of the members has been stimulated to a very large extent, and there is now no complaint of a lack of publicity. The monthly *Bulletin* of the association has appeared since July 1, 1902. It is now a recognized publication with an increasing list of subscribers. Of other features of the work the report speaks as follows:

"The 'limitation of output' question was taken up with our members and much valuable assistance was rendered the United States Department of Labor, in securing information on this vital subject. This information will appear in the report of the Department of Labor.

"The eight-hour bill was taken up in connection with the National Association of Manufacturers and valuable assistance was rendered by our members and legislative committee in securing information and in personal arguments before the Senate Committee on Education and Labor.

"The anti-injunction bill has also received considerable attention at our hands in connection with the National Association of Manufacturers.

"A large amount of circular and printed matter has been issued. Our expenses in this connection have been very heavy, but your commissioner considers the money well invested. The National Metal Trades Association is far better known today than it was a year ago. It would have been impossible to reach six thousand manufacturers personally in anything like the manner in which our printed matter reaches them. The printing has been a campaign of education which is now showing results. Whenever trouble comes the employers know where to turn. Whenever your commissioner or any other representative of the association calls on them these men now know something about us and we are able to do our personal work a great deal quicker and more efficiently than heretofore.

"The council authorized the appointment of a solicitor. Your commissioner secured the services of J. W. Walters, who is now on the road and has turned in a number of applications from good people.

"The commissioner himself, since Aug. 1, has done a great deal of traveling. Our members in different localities have responded loyally to his calls for assistance; they have arranged meetings with manufacturers in their cities at which your commissioner has appeared and presented the work of this association and its necessity. A number of local metal trades associations were formed or strengthened by these meetings and a number of employers' associations in different localities have also resulted from this policy. Your commissioner feels in this regard that it is well worthy of this association's effort to increase and foster such associations. The local metal trades associations increase the loyalty of the local manufacturers one to another, even though they are not all members of the National, making it considerably easier for this association to handle labor questions by eliminating the jealousy, suspicions and the lack of unity which so generally prevails among manufacturers. The organization of employers' associations, wherever they exist, are a strong influence on public opinion, to hold the agitator and turbulent element strictly within the law and to see to it that employers receive justice and protection of the law, things which this association give.

"The association has established a certificate system for tried and true workmen, who have been faithful to us during strikes. The number of these certificate men grows with each strike, and we shall soon have quite a body of these men whom we know can be depended on in case of trouble."

The portion of the report dealing with the strikes of the past year enumerates 36 cases. It is a noteworthy fact that during the year not a single case has been lost by the association, and it is also as noteworthy that so few troubles demanded the intervention of the association. In most instances the troubles were local. A case in which a conference committee did good work was that at Toronto, where a general demand was made by the machinists for 15 percent advance in wages. The conference committee had two meetings, one on July 10 and the second on July 22, which resulted in a settlement with the strikers, on the basis of an advance of 7½ percent from the rates prevailing April 1. As most of the shops had advanced wages as much or more than the award, the settlement from a monetary point of view was not expensive to the members. The minimum wage in Toronto was practically eliminated by the settlement. The conference also eliminated an arbitration agreement which provided for an odd arbitrator. A case growing out of the Toronto settlement arose in the shops of the Northey Co., Ltd. The company had advised two machinists that it could not keep them at the advanced rates, but could use them at the old rates. The matter being referred to the conferees, it was decided that the advance applied to all the men at work at the time the setttlement was made, and that the Northey Co. should pay these men the advance. The case was closed on this basis. Other cases are reported upon by the commissioner substantially as follows:

New York Blacksmiths.—On Aug. 18, the blacksmiths in the shops of the Quintard Iron Works, James Reilly Repair & Supply Co., and the Lidgerwood Mfg. Co., members of this association, went out, together with the blacksmiths all over New York and vicinity, demanding an increase of wages. This strike resulted in the formation of the New York Metal Trades Association. During the progress of the strike fears of a sympathetic strike on the part of the Central Labor Council of New York seemed imminent, but acting in conjunction with the committee of the New York Metal Trades Association, the sympathetic strike was staved off and the blacksmiths returned to work pending arbitration. Arbitration was held between the blacksmiths and the New York Metal Trades Association, resulting in an agreement not to strike for a year on the part of the union, the elimination of the minimum wage, and an advance in wages averaging about 7 percent.

Quintard Iron Works, New York.—This was a case of a sympathetic strike on the part of the boiler-makers of New York, against the Quintard Iron Works, because of their membership in the New York Metal Trades Association. The Townsend & Downey Shipbuilding Co. having refused to discharge two men, not members of the union, all the ship yards, members of the New York Metal Trades Association, were struck in sympathy, by the New York Boiler-makers' Union. The Civic Federation was brought into the case and the sympathetic strike was declared off and the men returned to work, after having been out a week.

The Payne Co., Elmira, N. Y.—The machinists in the Payne

Co. shops struck demanding the abolition of the premium plan. Mr. Payne made all reasonable efforts to arrange matters peaceably, but was unable to do so. A business agent of the Machinists' Union, from New York, used his influence to such an extent that the men struck on Jan. 17. The shop is running under bonus. This case is pending.

Weir & Craig Mfg. Co., Chicago.—Demands on the part of the brass workers, machinists, firemen and engineers for a nine-hour day and readjustment of wages, together with many other unreasonable demands. This has resulted in the formation of the Brass Manufacturers' Association of Chicago, who have handled the matter independently, and have settled by making an agreement to arbitrate all differences with the brass workers, in consideration of the nine-hour day with ten hours' pay. Local conditions in Chicago being such as they are, it was deemed advisable for our members to join the Brass Manufacturers Association and as such go into that agreement, which policy has been recommended to them by your commissioner.

Canadian Locomotive Co., Ltd., Kingston, Ont.—Seventy machinists involved. This case has been the longest drawn out of any and the machinists are still annoying the company at this date. The case began April 1, 1902. The demands were originally the usual sort, but finally settled down to a demand to remove a handyman from what the machinists claimed as a machinist's job and the further demand that no handyman should ever be promoted to machinist's work, no matter how competent he became or how long he had worked at the trade. Mr. Bermingham, managing director of the Canadian Locomotive Co., has handled this case in a masterly manner all through, but the company is laboring under the difficulty of Canadian politics. A number of men have been imported from Scotland and Germany and while the strike has interfered with the company's business, work has never stopped. The machinists have taken away some of the imported men, but others have been brought on to take their places and indications point to the matter being definitely closed in the near future.

Cincinnati Pattern-Makers.—In this case the pattern-makers demanded the renewal of an agreement that had existed for two years with the jobbing shops, and on terms much less favorable than the old agreement. The jobbing shops were taken into the National Metal Trades Association, and an interview was had between your commissioner and the president of the Pattern-Makers League of North America, Mr. James Wilson, which resulted in the withdrawal of all demands, the shops running now as open shops, under the declaration of principles. Later, however, on Dec. 29, a general demand was made on all employers of pattern-makers of Cincinnati, for a 10 percent advance in wages. Being a purely local question, this phase of the case is being handed by the Cincinnati Metal Trades Association and the places of the men who went on strike are being gradually filled.

Kempsmith Mfg. Co., Milwaukee, Wis.—This case was a strike in which this association has filled the shop and is keeping it filled. The demand in this case was the discharge of a foreman, and the reinstatement of a previous foreman. There is a further complication in the case, in that the company are using the premium system, which is obnoxious to the machinists' union.

The report closes with the following recommendations as to future policy, after laying stress on the necessity of organization as the uppermost consideration in the past year's work. From this time on it is expected that the work done at great cost of labor and money in the past year will tell strongly in the prevention of strikes and in making the influence of the association felt in restraining unreasonable demands:

"1. Agitation: Agitation among employers to organize, and assistance in the organization of free workmen into independent bodies, which will resist the tyranny of the unions must be continued. The heavy increase in membership of the last few months shows that our agitation is now bearing fruit.

"2. Organization: We will continue by correspondence and personal visit to get new members into this association and we shall continue to organize employers' associations and local metal trades associations at every opportunity, and help to make them as effective as possible.

"3. Education: The education of the employer after being organized must be carefully looked after. The first thing is to get their organization firmly established, the members loyal to each other and able to present a united front to every danger. Once that is done, we can proceed to business. In the judgment of your commissioner the principal work of this association for some time to come will be the education of employers along these lines. The organization of employers must be made a great school to dispense information among the people and to afford them the best exampe of self-restraint, fair dealing and public spirit. Unless our organization makes us wiser and more capable of handling the labor question in its broadest aspects, aside from the mere matter of breaking strikes, we had better have none of it. Mere temporary expedients will not suffice.

"A policy must be laid down by this convention, for the guidance of the association and its officers, which will make for permanent industrial peace, as well as to amply provide sinews for industrial war. If guerrilla warfare is to be maintained, steps must be taken to meet it in the most efficient manner.

"This convention will no doubt have great influence on the industrial policy of the metal trades in this country, and on your decision of the various questions that will come up for discussion much will depend, as to our continued success and further development in the broadest and best manner."

Secretary's Report.

Secretary Wuest's report showed an increase in membership of over 56 percent during the year. There are now 25,000 operatives in the shops of the membership. In the past four months the gain in applications was 74, representing 5,000 operatives.

Those in Attendance.

The early registration shows a total of 98 names, with many others expected today. The Manufacturers' Club, of Buffalo, will give the visitors a smoker tonight in the Ellicott Square Building. Below are the names of some of the early arrivals: S. W. Watkins, E. F. DuBrul, A. H. Bullard, Bridgeport; W. B. Payne, Elmira; Robert Wuest, M. H. Barker, Boston; H. N. Covell, Brooklyn; W. P. Eagan, F. W. Wolf Co., Chicago; F. B. Polson, Toronto; Lewis Staring, Denver; D. J. Kilby, Cleveland; T. Davenport, South Norwalk, Conn.; M. A. Reeves, Columbus, Ind.; F. W. Bozee, Cincinnati; C. M. Stamp, Mt. Vernon, O.; R. L. Kenan, Jr., New Brighton, Pa.; Wm. M. Medart, St. Louis; Geo. T. Bliss, Erie, Pa.; J. V. Wright, Dayton, O.; E. T. Gilbert, Detroit; O. B. Kinnard, Minneapolis; W. H. Pfahler, Philadelphia; J. N. Gardner, Quincy, Ill.; G. F. Steedman, St. Louis; Alex I. Lewis, Detroit; L. A. Strong, Bridgeport, Conn.; A. H. Folger, East Boston; C. F. Mayer, Cincinnati; H. Ritter, Cincinnati; N. DuBrul, Cincinnati; E. H. Hargrave, Cincinnati; T. C. Honeart, Cincinnati; H. M. Norris, Cincinnati; J. O. Thorn, Toronto; E. E. Greenwald, Cincinnati; L. D. Reilly, Rochester; John D. Hibbard, John Davis & Co., Chicago; F. K. Copeland, Chicago; Fred F. Stockwell, Cambridge, Mass.; John E. Lynch, Hodge Boiler Works, Boston; Charles F. Elmes, Chicago; H. H. Latham, Chicago; W. H. Stevenson, Florence, Mass.; L. W. Knotts, L. Booth, Pittsburg; A. Falkenau, Philadelphia; F. Macomb, Geo. V. Cresson Co., Philadelphia; John Oddsit, Hornellsville Foundry Co., Hornellsville, N. Y.; W. D. Sayle, Cleveland; Walter M. Bacon, Boston; C. Birmingham, Kingston, Ont.; W. L. Pierce, Lidgerwood Mfg. Co., New York; P. G. March, Cincinnati; Chas. E. Thomas, Cleveland; R. J. Whyte, Smiths Falls, Ont.; O. P. Briggs, Minneapolis; Thomas M. Roche, Cleveland; Theo. P. Byram, Detroit; H. C. Hoefinghoff, Cincinnati; D. D. Russell, Boston; H. P. Eells, Bucyrus Steam Shovel Co., South Milwaukee; S. L. G. Knox, Milwaukee; Geo. W. Watts, Toronto; George A. Lautz, Buffalo; H. S. Teal, Buffalo; James Gleason, Rochester; W. B. Cowles, Cleveland; Fred A. Scheffler, Harrison, N. J.; Wm. Lodge, Cincinnati; N. R. Wood, Cincinnati; M. E. Kennedy, Coxsackie, N. Y.; James Eastwood, Paterson, N. J.; S. P. Eagan, Cincinnati; C. S. Yarnell, Minneapolis; H. M. Kelly, Pittsburg; E. E. Bartlett, Boston; Henry F. Arnold, Boston; A. M. Powell, Worcester; Paul B. Latchford, Chicago; H. E. Goodman, Chicago; Henry M. Leland, Detroit; E. P. Robinson, Boston; W. A. Jones, Chicago; Geo. Rudge, Jr., Youngstown; Arthur E. Jones, Cincinnati; J. N. Derby, New York; P. D. Kendig, Seneca Falls, N. Y.

At the Wednesday afternoon session, reports of committees on legislation and finance were received with reports from district chairmen and unfinished business was considered. At tonight's informal meeting there will be an address by J. C. Larkin, president of the Manufacturers' Club; papers by Fred

A. Geier, J. H. Wright, of National Cash Register Co., and J. C Hobart. Tomorrow morning H. N. Covell will open the discussion on "Agreements," and A. B. See that on "Hours." The afternoon session will have papers presented on "Boycotts" by A. H. Bullard, "Free Workmen" by R. H. Jeffrey, "Apprentices" by Wm. H. Pfahler and Wm. Lodge, "Premium Plan" by H. M. Norris, followed by sundry questions.

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., NEW YORK, March 30.

The closing of March finds the machinery trade in a much more prosperous condition than at any time since the present year began. While during January and February there was a disposition here and there to believe that a lull in the notable progress of the machinery trade during the past year was about due, confidence in the continuance of it is now expressed on all sides. There seems to be no let-up in the projects that are coming to the front, involving the use of machinery, many of which are yet in an embryonic state. Salesmen's reports also speak of buyers being more willing to contract for machinery than they have been thus far this year. Taken as a whole, small orders were in the ascendancy during the month, but in the aggregate they formed a very profitable business. Even where concerns are known to be in the market on a large scale for machinery, the practice of giving out the orders at one time seems to be on the decline, and that of buying in small lots at different intervals becoming more prevalent.

In machine tools the month was notable for the conclusive evidence it gave that propositions calling for some good items and which have contributed largely to current gossip for some time, are now in readiness for submission to the trade. Among these is the equipment for the new shops of the Pennsylvania Railroad at Altoona, Pa., and which will comprise an outlay of several hundred thousand dollars. Some of the orders have already been given out, but they represent only an insignificant portion of those which will shortly follow. The Westinghouse Electric & Mfg. Co. has also given its initial orders for the machine tools it will install in its new shops at East Pittsburg, and which will call for an expenditure of about $1,000,000. The company, however, seems inclined to only purchase several tools at a time, instead of the entire amount at once. The International Steam Pump Co., despite all reports to the contrary, is not yet prepared to send out the specifications for the machine tools for the new shops of Henry R. Worthington, at Harrison, N. J., the orders for which will foot up to about $500,000. The specifications are practically ready, but the work on the construction of buildings has been so greatly delayed, in consequence of the inability to get the structural material quick enough, that the company thinks it too early to enter the market now, although it really expected to do so in the early part of January. The trade has not yet heard any definite news concerning when the Ingersoll-Sergeant Drill Co. will purchase the entire equipment for its new plant at Phillipsburg, N. J. One thing is known, however, and that is that it will not be as large as the size of the plant would indicate, the company having added new machinery to its present plant quite steadily during the past two years.

The General Electric Co. is now considering the equipment for the new 150x600 feet extension to its Schenectady plant, which we announced in our previous letter. The outlay will easily reach $100,000, and the list will reach the trade any day in the near future. The company has under advisement still greater improvements to its plant, to meet the requirements of its rapidly increasing business, but details may not be given out for several months yet. Progress is reported on the plans for the erection of the large addition to the Stanley Electric Co.'s plant at Pittsfield, Mass., which the officials of latter company had tentatively decided upon previous to the absorption of their business by the General Electric Co.

Prices for machine tools during the month were exceptionally well maintained. Those named on bids demonstrate this beyond a doubt, being higher as a general thing than any submitted this year so far. Varying views are given regarding deliveries, some contending that they are fairly good because variety has entered more largely into orders, while others say that the increase of orders that has taken place has been so much better than was anticipated that deliveries are somewhat stiffer than they have been. The appearance of store rooms shows that the month has made deep inroads into standard stocks, and as a result these are more barren than last month.

The engine and boiler departments report trade to have improved considerably recently. In the former less hesitation is noticed in the placing of orders. The bulk of the orders is for small lots, and ranging from 200 to 650 horsepower. Buyers are very particular about delivery, and cases are numerous where this has been the main factor in the placing of orders.

Secondhand engines up to and including 600 horsepower are extremely scarce, and good prices are cheerfully paid where any are obtainable. In boilers, business in small units is said to be particularly brisk.

Builders of electrical machinery have nothing but assurances of prosperity to offer in their line. Street railway systems are excellent customers nowadays, and the purchases they made during the past month, mainly to meet the requirements of the increased spring and summer travel, have been very large. The Brooklyn Rapid Transit Co. purchased quite freely, and also announced that it has plans under way to increase its capacity by 60,000 horsepower during the present year. The bill authorizing the New York Central Railroad Co. to change its motive power from steam to electricity, from the Grand Central Depot to Croton, N. Y., has passed the State Assembly. The necessary equipment will cost more than $6,000,000.

Power transmitting machinery has shared quite notably in the month's good business. New England and the Southern States have purchased some round lots. Prices are a shade higher than they have been. Manufacturers of woodworking machinery report an increase in their orders for the month, with the chief demand emanating from furniture and piano making establishments. The general supply machinery business is characterized by a large and increasing trade.

The foreign machinery trade took a slight brace during the month, but nothing of any consequence can be noted. Machine tool men are making no effort to obtain orders from abroad, and are in striking contrast to electrical machinery manufacturers who are now giving more attention to foreign fields than ever, and who are rewarded with a goodly number of orders.

The plans have been completed for the new plant the Lidgerwood Mfg. Co., of 96 Liberty St., will erect in Newark, N. J., and which when completed will cost about $2,500,000, and give employment to at least 2,500 men. The company recently petitioned the Newark authorities to close several streets, in order that it might begin the construction of the plant at once, and its request was granted a few days ago. The company is now making the structural arrangements for the foundry, which will be 120x500 feet, and which will have an extension of 75x80 feet and three cupolas. Work will be begun on this immediately, but the orders for the necessary equipment will not be given out for at least several weeks. The principal building of the plant will be the erecting room, which will be 120x720 feet. The light and heavy tool shops will each be 75x267½ feet, and buildings of the same size will form the blacksmith, boiler, and pattern shops, as well as the shipping department, respectively. A brick structure, 50x50 feet and three stories high, will be occupied by the offices. The land purchased by the company was originally 1,200x800 feet, but several more lots were acquired during the past week.

Paul Bigelow, representing the Buckeye Engine Co., has received an order for one 100 and one 200 horsepower tandem engines, and one 400 horsepower cross compound engine, from J. W. Brown, Jr., Cleveland, O. He also closed a contract with the New Amsterdam Gas Co., of Ravenswood, L. I., for one 16½x16-inch hand regulating cutoff for direct connection to an exhauster.

The Prentiss Tool Supply Co., of 115 Liberty St., report its March business to have been extremely good, with the machine tools of Lodge & Shipley Machine Tool Co. in particularly good request. The company's Boston office states demand in New England to have been very brisk recently.

The George V. Cresson Co., of 141 Liberty St., received during the month an order for transmitting machinery from a textile mill in Mexico, which amounted to $35,000, and which

took nine cars to transport. The company's foreign business, especially in South America and Australia, has greatly improved during the past fortnight.

The Rockwell Engineering Co., of 26 Cortlandt St., expresses the greatest satisfaction with the orders it is receiving for its fuel oil burning appliances and its portable forge. The company has more business on hand now than at any time since its formation.

J. J. McCabe, of 14 Dey St., is meeting with considerable success in introducing his "new style" heavy pattern double spindle lathe, and booked some excellent orders for it recently from several Southern machinery firms.

Mackenzie & Quarner, the New York representatives of the Harrisburg Foundry & Machine Works, moved a few days ago from 203 Broadway to 114 Liberty St.

F. L. Smidth & Co., New York, report that business at the present time is very good, and the outlook very promising. During the early weeks of this year they were somewhat behind on deliveries, but by increasing the force of men and working double time, they were able to get abreast of orders. They are installing one of their ball mills, and one Davidson Patent tube mill in the coal department of the Edison Portland Cement Co., at Stewartsville, N. J. This order was placed immediately after that company met with an explosion in its coal room. These are the first machines of the ball mill and tube mill types that have been installed in its works. For the new plant at West Coplay of the Lehigh Portland Cement Co., Smidth & Co. are delivering tube mills and "kominuters." The latter is their new coarse grinder, and is designed to take the place of the ball mill. They are also supplying an additional kominuter to the German American Portland Cement Works, La Salle, Ill., and have on order two kominuters for the Virginia Portland Cement Co., Craigsville, Va., and two for the Portland Cement Co. of Utah, Salt Lake City, Utah. At this time they are installing kominuters and tube mill in the works of the Helderberg Cement Co., Howes Cave, N. Y., and also the works of the Nazareth Cement Co., Nazareth, Pa., and have just completed the installation of a kominuter at the works of the Reading Cement Co., and also one at the Wellston plant of the Lehigh Portland Cement Co.

The American Engine Co., through E. S. Boyer, its New York representative at 95 Liberty St., has closed the following contracts: one 400-horsepower duplex engine, to Odiorne & Morse Co., Little Ferry, N. J.; five 80-h. p. engines, the Baldwin Locomotive Works, Philadelphia; one 120-h. p. duplex engine, Keuffel & Esser, Hoboken, N. J.; one 80-h. p. engine, A. Metz Color Works, Newark, N. J.; and one 120-h. p. duplex engine, the American Vulcanized Fibre Co., Newark, N. J.

The Premium System.

BY ROBERT GRIMSHAW.

The articles which have appeared and the various papers which have been read on the premium or bonus system have been of great interest and value; but there have been made some statements which seem to me to be incorrect, and which I have not yet seen contradicted. I refer in particular to the case where two men work successively or even at the same time on a job, and where it is stated that the premium system is applicable. I will take a case cited, where the time limit is 80 hours and A and B working one after the other finish the work in 50 hours. The saving is 30 hours and it is stated that if A puts in 30 hours and B 20, A should have 30-50 of the premium and B 20-50. We will suppose A and B really do an equal amount of work, which under the day's wages plan would have taken 80 hours, and that A does his half in 30 hours instead of the former 40 and B his half in 20. Here A has really saved 10 hours and B 20, on an equal amount of work, and B should get two-thirds of the premium instead of two-fifths.

And in case A is a laggard or an inexperienced hand, and takes 45 hours to do what he ought to have done in at least 40, and B takes only 20 hours to do the same work, the sum of the two periods is 65 hours, leaving a saving of 25 hours, the premium for which on the "proportionate time" plan would be divided in the ratio of 45 to 20, giving A 45-65 or 69.2 percent of the premium and B only 20-65 or 30.8 per cent. Yet A has really done less than the normal amount of work and ought if anything to be fined, or at least counted out.

While the injustice of this "proportionate time" plan is more readily pointed out and calculated where one man's work follows that of another, it exists in the same degree where they work side by side, as in assembling. The poor workman or the loafer in this case gets the advantage of the increased duty of his superior.

QUESTIONS BETMEEN EMLOYER AND EMPLOYE.

The wage scale of molders of stove castings will continue the same for the year beginning April 1 as for the past year. This agreement was reached at a conference of representatives of the Stove Founders' National Defense Association and the Iron Molders' Union of North America, held in Cincinnati. The molders asked an increase of 10 per cent., but were persuaded that such an increase would not be beneficial to the business, and would curtail consumption.

Circulars containing the demands of the union machinists of Chicago have been mailed to all employers of that city. The demands are to go into effect May 1st, and are for a 9-hour working day, 5 per cent. increase in wages, and an additional amount to machinists who would receive less than 30 cents an hour.

The American Bridge Co. has had considerable trouble with strikers at the bridge which it is building at Solvay, near Syracuse, N. Y., and has been compelled to call upon the sheriff to protect its workmen. It is charged that striking bridge builders drove away the watchman, destroyed several hundred dollars worth of material and fired a shot at the town hall.

The Niles Tool Works Co. has granted the 54-hour week to its employes at Hamilton, O. Minor differences have been adjusted and there will be no strike.

The extreme to which workingmen will sometimes go is illustrated by the following letter, sent a few days ago to the Penberthy Injector Co., Detroit, by its employes:

Dear Sirs: You have in your employment a man named Walter Wilkins, who is not a member of our Brass Workers' Union, and whom we have urged to join, and he has not done so, or given us any positive promise that he will. We, the shop committee representing said union, demand he either join our union before Wednesday night or that you discharge him. If this demand is not complied with the members of our union will quit work in your factory until the above conditions are complied with.

Forty-seven manufacturing concerns have united in meeting the above demand by adopting the following resolutions:

Whereas, the attention of the undersigned 47 manufacturing concerns has been called to the demand served on the Penberthy Injector Co., of Detroit, by a committee representing the Brass Workers' Union; and

Whereas, we believe that every man has an equal right to employment, and the chance to earn an honest living; and, further believing that every employer has the right to give employment to any man applying for the same. Now, therefore, be it

Resolved, That said demand of the Brass Workers' Union, being unreasonable and contrary to all principles of justice, will not be complied with, and each of us hereby pledges his support to the Penberthy Injector Co. in the position assumed by it, namely, the right to employ or discharge from its employ any man regardless of his affiliation with any society.

The National Association of Stove Manufacturers will meet in Cleveland May 12, 13 and 14. The local committee of which C. H. Miller, of the Champion Steel Range Co., is chairman, and Wm. Bates, of the Kirk-Latty Mfg. Co., is secretary, is preparing for the entertainment of the visitors.

Philadelphia Machinery Market.

March 31.

There is little or no change noticeable in the condition of the machinery market. It as strong and vigorous as ever, and there is little in the outlook of a disturbing character. The month just closing, in point of volume of business, was slightly better than the other months of the year, but some little disappointment exists over the absence of some of the large contracts which were expected to go on the books of different builders this month. In the main, business was made up of small orders, and was of the character which has existed since the opening of the year. That transactions of large calibre would have been completed it was quite natural to suppose from the inquiries which have flooded the market since Jan. 1. A positive reason for the hesitancy of the larger buyers is hard to advance. The railroads were expected to come into the market this month for a lot of new shop equipment, but little business from this source resulted.

Machine tool builders, as a rule, are satisfied with trade conditions. There is not so much business offering that it cannot be taken care of properly, and it is sufficiently above the normal point to assure the full running of most shops for some time to come. Inquiries for tools include many for specials, or standard tools embodying special features. Particularly is this the case in regard to lathes. Indeed, some of the demands made appear ridiculous and entirely out of the power range of the standard.

The shortage of materials has occasioned much inconvenience, and little improvement in this condition is noted over last month. The foundries are especially handicapped for want of iron and coke, these materials being hard to get, not so much from the inability of the producers to ship them, as through the incompetency of the railroads to deliver. With a congestion of traffic in existence for several months consumers are beginning to ask whether the railroads are doing as much as they might to relieve the situation.

The inquiry from abroad has improved somewhat, and some nice specifications are on the market. Orders, however, are not plenty, nor have they been for some time.

Edwin Harrington, Son & Co. are preparing to abandon their present plant at 15th St. and the Reading Subway. They sometime ago purchased a site on Callowhill St., between 16th and 17th Sts., 100x400 feet, and on this they will erect a two, four and six-story building, 100x200 feet. Plans are now being prepared, and as soon as completed building operations will be commenced. Their present plant is pretty well hemmed in by the Baldwin works, and will probably be absorbed by the locomotive builders as soon as vacated. Harrington & Co. are quite busy on orders for their different productions, machine tools, hoists, cranes and conveying apparatus.

The Phosphor Bronze Smelting Co., Ltd., has had plans prepared for a new rolling mill building which it will erect as an addition to its works. The equipment for the mill, including the engines, is being built by R. S. Newbold & Son Co., Norristown, Pa.

The director of public works of the city of Philadelphia today awarded a contract for installing electric light plants at the upper and lower Roxborough filtration stations to the Pennsylvania Equipment Co. The amount of the contract is $15,131.

The Penn State Construction Co., of Philadelphia, is erecting a 700-h. p. plant for the Westernport-Lonaconing Railway Co., Cumberland, Md. Two 350-h. p. engines and boilers and two 225-k. w. generators are included in the equipment.

The Wyoming Valley Supply & Mfg. Co., M. F. O'Malley, president, Scranton, Pa., organized to manufacture and deal in plumbers' and steam fitters' supplies, has made some purchases of equipment in this market. Among the orders placed is one with the Turner Machine Co. for molding machines and automatic cock grinders.

The I. H. Johnson Jr. Co., builder of lathes, reports a good business for the month, booking some good orders. Its shipments for the month, however, were light, although numerous. It has a lot of heavy tools approaching completion in its shops, and expects that April will be a very heavy shipping month.

Thos. H. Dallett & Co. say that March has been an excellent month with them, and orders for their different lines of air tools and portable machinery are satisfactory in both numbers and size.

The Eguon-Evans Mfg. Co. has commenced to install equipment in the extensions it has recently made to its plant. A 200-h. p. Berry boiler is already in position and ready for operation. It will install a travelling crane in the new foundry extension, also an air compressor and an outfit of pneumatic tools. Molding machines will also form part of the added equipment. Outside of the power equipment the machinery required has not yet been purchased. The additional floor space presented by the new buildings and the contemplated alterations to the main plant will give the company much needed facilities for turning out its products more promptly. It is meeting a splendid demand for its engineering specialties. Among its shipments this month were a condenser to The Maryland Steel Co., Sparrows Point, Md., and another to Wm. T. West & Co., Rowlandsville, Md.

The Philadelphia Pneumatic Tool Co. had a very good month. Among the larger contracts taken was one from the Lake Shore & Michigan Southern Ry. to supply all the pneumatic hammers to be used in the new Collinwood shops, as well as in the shops of the remainder of the company's system, for the period of one year. The company has also some orders of good size for hammers and drills for the shops of the Wabash, Delaware & Hudson, and Central R. R. of New Jersey. Among other orders are those for complete plants and auxiliary equipment for the Cambria Steel Co., Johnstown, Pa.; Baldwin Locomotive Works, Philadelphia; Maher & Flockhart, Newark, N. J.; American Bridge Co., Philadelphia; Allis-Chalmers Co., Chicago; New Jersey Bridge Co., Newark, N. J.; American Car and Foundry Co., Detroit, Mich.; The Great Lakes Engineering Co., Detroit, Mich., and the Lackawanna Steel Co., Buffalo, N. Y. Foreign business has also been a feature of the month's record, about 100 tools having been shipped on orders sent from the company's representatives in Europe.

The Quaker City Electric Co., builder of dynamos and motors, and electrical contractors, has a great deal of work on hand at its plant. It has recently installed power and lighting equipments in the factories of The Southdown Knitting Co., Allentown, Pa.; The Corona Kid Co., Bristol, Pa.; Frank Schoebel, Hat Manufacturer, Philadelphia, Pa., and Chas. H. Johnson, Paint Manufacturer, Philadelphia.

The J. W. Paxson Co., manufacturer of foundry equipment and supplies, says business is very good with it in all its numerous departments. It is making some nice installations of its sand blast apparatus and receiving excellent report from the users. A recent installation on an extensive scale was one made at the U. S. Navy Yard, Washington, D. C.

The Capilar Co., 136-138 S. Fourth St., is a new concern, putting on the market a line of oil filters for power plants, the filters being operated upon the principle of capillary action. Quite a number of the machines have already been sold, and the prospects are that a good business will be speedily built up. The filters are built to suit plants ranging from small to the largest capacities.

The Tabor Mfg. Co., builder of molding machines, had a very good business during the month, both orders and inquiries being more prolific than during January and February. The first quarter of the year, in point of volume of business, closes with an aggregate of business greatly exceeding that of last year for the same period. It made many good shipments, including one on an order for immediate shipment of seven machines by express. These machines were shipped a few hours after receipt of order to a point 200 miles away, and within a week were all in operation on ordinary gated patterns.

The Falkenau-Sinclair Co., builders of presses, hydraulic machinery, testing machines and special machinery, had a very good month. Their shipments covered mainly standard presses and tools and several ordinary testing machines. These were largely on orders from the West. It has a great deal of heavy work in hand, shipment of which will commence next month. Perhaps the most interesting of its shipments was that of a special precision lathe with shaping and milling attachments in combination. Orders taken during the month include some large hydraulic presses.

Wm. Sellers & Co., Inc., are very busy in all the departments of their large plant, and have enough orders on hand to keep them busy for some time to come.

LAKE SUPERIOR IRON MINES.

Corrigan, McKinney & Co. have been doing a large amount of work on the Gogebic range. The shaft at the Colby is being sunk deeper and at 575 feet the fourth level is being opened. The Ironton will be placed on the shipping list this season. The Meteor is stocking some ore, but is not doing as much as was expected of the property.

Results are slow in materializing on the western Mesabi. Some of the drill holes at the old Arcturus property are 100 feet deep, still in taconite, without encouraging indications.

The Hawkins mine on the Mesabi has about 70,000 tons on the stock dock and it is expected that large shipments will be made this season.

Extensive improvements have been made during the winter at the Vivian mine of the Verona Iron Co. on the Menominee range. Two new shafts have been sunk, several hundred feet to the south and west of No. 1 and several hundred feet lower. No. 1 shaft on the hill is soon to be abandoned and the machinery will be used at Nos. 2 and 3.

The Buffalo & Susquehanna Iron Co. has purchased the Shaw exploration on the Menominee range, consisting of two forties in Section 6. The property will be operated this season and it is expected that a considerable quantity of ore will be shipped.

The Crosby will be the first mine of the Cleveland-Cliffs Iron Co. on the Mesabi to ship ore. The contract for stripping has been awarded to the Drake & Stratton Co. and calls for the removal of 150,000 cubic yards of earth. The Crosby is said to be an easy stripping proposition.

The Kinney mine on the Mesabi will be a shipper this year. The stripping is well advanced.

Mesabi Ore, of Hibbing, Minn., quotes J. E. Longvear, a mining man of wide experience, who has just returned from the Highland range, as follows: "It is too early to condemn the section. The pits are shallow as yet and no depth has been reached in the explorations. From what I saw I should not say there was any reason contained in it for a panic. On the other hand, no one has a license to shut out the story of the richness of the range, unless he has seen more than I have. There may be some valuable finds there, but as near as I could ascertain, they have not yet been made."

Messrs. Hubbell, Merritt et al. have organized the East Biwabik Mining Co. and have bought of Alf and L. Merritt their exploration in section 2 T 58 R 16. The former explorers have cut a shallow deposit of ore in two holes, and there is a prospect of better finds with more work.

Most of the work that has been under way in T 59 R 14 has been stopped and most of the drillers have been taken elsewhere. Very little of value has been found there. The ore-bearing formation of that township seems to be badly mixed, and the ore found there is mostly mixed and lean.

The Boston & Duluth Farm Land Co., which is a large owner of land on what is locally called the "Highland Range," is to put in a drill at a location where there are said to be indications of iron. Three or four churn drills are working, or being placed, on lands on the range. Nothing of any value has been found as yet.

Stripping contracts for the Leonard mine have been let to Drake, Stratton & Co. to the amount of 2,000,000 cubic yards, of which 300,000 yards will be moved this year. The stripping at this mine is about 60 feet deep and the property will be milled. A shaft is now going down. Machinery has been bought from the Lake Shore Engine Works of Marquette.

Drake, Stratton & Co. have work at the Leonard and Crosby new mines, and at the Fayal, Stevenson and Sharon old mines, and will employ about 900 men this year. Stripping at the Stephens, Biwabik Adams, Duluth, Mountain Iron and Mahoning is being done by the owners; at the Kinney, Morris and Day, Morrow, Cypress, Leetonia, La Rue, Hawkins, Croxton and some others, by various contractors.

The Duluth mine, which ships to Jones & Laughlins, is to double its force and will mine heavily this summer. It has been stripping all winter and the product from the shafts has been unusually light.

Corrigan, McKinney & Co. have taken assignments of State lease in section 16 T 57 R 21, where there is a poshibility of ore, and will explore at once.

W. P. Snyder & Co., who last August bought the Webb property in section 5 T 57 R 20, will probably open the tract for mining. It will be an underground property, much of the ore lying under a considerable thickness of rock.

Canonsburg Steel & Iron Works.

PITTSBURG, April 1.—It is probable that the difficulties existing between the Canonsburg Steel & Iron Works and the Amalgamated Association will be adjusted this week, and that operations will be commenced immediately thereafter. The proposition to have the men work at a reduction of 15 percent below the Amalgamated scale was rejected by the officials of the association and when the officers of the Canonsburg Steel & Iron Works determined to operate without union men a strike was declared on at the plant. The present negotiations will probaby lead to the operation of the plant under the Amalgamated scale. It contains six sheet mills and was formerly owned by the American Tin Plate Co. John F. Budke is president and general manager; John M. Watson, vice president; and William H. Paxton, treasurer.

A Long Blast Furnace Campaign.

(Special Telegram.)

PITTSBURG, April 1.—The life of the lining that is being taken out at Furnace H of the Edgar Thomson group exceeds all previous records, having been put in nine years and four months ago. This is remarkable in view of the fact that with furnaces working at high pressure as at the present time the life of a lining averages less than two years. This stack was blown in in March, 1890, and is 90 feet high and 20 feet at the bosh.

A revised edition of Edward Kirk's "Cupola Furnace" has just been issued. About 200 pages of new matter relating to cupolas, fuels, foundry irons and chemistry have been added, which makes the book one of the most interesting ever placed before foundrymen.

H. W. Cramer has been appointed foreman of the foundry of Wm. Adams & Co., Philadelphia.

C. Bewley will have charge of the new works to be built by the Oregon Foundry & Mach. Co., Oregon, Ill.

George Batten, for the past three years foreman of Reeves & Co.'s foundry at Columbus, Ind., has retired and is succeeded by Perry Wooden. Mr. Batten will be connected with a new foundry to be started at that point.

The Syracuse Heater Co., Syracuse, N. Y., has purchased a site in the suburb of DeWitt, upon which a new plant will be constructed. The first building to be erected will be a foundry, 100 feet square, so arranged that additions can be made at any time. Other buildings will be provided for the assembling and mounting of castings and for storing goods and material. Charles D. Howard is president.

THE STATUS OF THE "CLERGUE" ENTERPRISES.

(Special Correspondence.)

SAULT STE. MARIE, Mich., March 30.—The stock market in Philadelphia has recently reflected a most unhappy condition for the Consolidated Lake Superior Co. There is nothing in the actual operations of the allied industries at Sault Ste. Marie to indicate sufficient cause for the tremendous decline, with all its severe losses. It is sometimes the case that stock market conditions do not reflect truly the affairs of a company, and this seems to be the fact with this concern.

The allied industries at Sault Ste. Marie, which are generally known as the "Clergue enterprises," are controlled by a number of subsidiary companies whose stock is held by the Consolidated Lake Superior Co. This is a Philadelphia concern. It is capitalized for $30,000,000 of preferred and double that amount of common, the latter representing no investment, the former cash. There is no bonded debt aside from some small amounts upon some of the subsidiary companies. The common stock value is claimed to lie in the vast and rich concessions and grants by the Dominion and Ontario governments and in the practical monopoly of the water power of Lake Superior, which the company doubtless has absolutely within its grasp through the ownership of riparian rights on both sides the river for some distance above and below the rapids, and by contracts with the proper authorities in both Canada and the United States.

For the past ten years this company, under the leadership of Mr. F. H. Clergue, has been pushing development of the numerous industries that seemed to him profitable and that might be developed by the resources of the "New Ontario." An immense amount of money has been spent, for which there has been, until just now, little actual return. Those of the industries that have been operating any length of time have been earning well, and the expectation is that the rest will do well when their time comes. But it has been unfortunate that the length of time requisite for the completion of these industries has been underestimated by most of those who have been putting up the money. Few of the directors of the company have seemed to be as conversant with the actual developments on the ground as could have been wished. That this is the fact is very evident from the course of the market of late, and from the slight assistance they have given their stock.

The Lake Superior Power Co. operates a 100-ton ground wood pulp mill and a 50-ton sulphite pulp mill, by water derived from the canal on the Ontario side the river. This canal also furnishes and sells power for generating electricity for the works of the Canadian Electro Chemical Co., for the Algoma Steel Co., for the Trans Ste. Marie Rapid Transit Co. and for other enterprises, all of which, aside from the Chemical Works, are subsidiary to the Consolidated Co.

The Sault is especially well fitted for the wood pulp industry. Not only is there a constant and magnificent water power, never troubled by ice, drouth or floods, but the water is always perfectly clear and pure, by reason of which the company's product is always white and clean, differing greatly from that made at most mills where during certain seasons of the year the water is dark or muddy. To these advantages are added an unlimited supply of the best grades of wood, growing along the line of the company's railway or in other parts of its land grant close to Lake Superior. On account of its quantity, its quality, its nearness, its possession at small cost, the item of raw material for these mills should be far less than that of competing concerns through the United States and Canada. Both the wood and sulphite mills are now sold up for many months ahead and at a very large profit. The sulphite mill has been in operation but a short time, but all the new mechanical and metallurgical inventions adopted at this mill with a view to saving by products and lessening costs, are working most satisfactorily. So successful are the mechanical devices that fewer men are required in these mills than for an equivalent product anywhere.

The second group of industries here is the metallurgical. These are based on the company's iron and nickel mines, in the Michipicoten and Sudbury districts. In the Michipicoten district is the Helen iron mine, developed by a production of about 350,000 tons a year, which amount will be shipped this season. Other properties are in course of exploration and development. In the Sudbury district are several nickel and copper mines, developed for a large production, and now shipping raw ore and matte. At the Sault are the steel works of the Algoma Steel Co., with two 150-ton charcoal furnaces and a Bessemer steel mill. The latter was completed last year, and ran for a short time on iron from outside furnaces, but the difficulties of making steel with pig iron in insufficient supply and at the prices prevailing, have closed this works until the company's own furnaces are in operation. No. 1 furnace is about ready and fires to dry it will be lighted this week. It is well built with all the latest appliances for handling ore and metal, with automatic charging apparatus, a casting machine and ample dock and storage room for ores, fuel and limestone. A Hulett automatic unloader, electrically driven, is being built for taking ore from the vessels. In the great fireproof engine house one blowing engine is in course of erection and others are on the way from makers' shops. No. 2 furnace is also nearly ready. It is expected that No. 1 will blow in not later than May. Fuel will be charcoal, and two large plants of beehive ovens are now in successful operation in the woods near by. These have timber immediately adjoining that will maintain them for at least ten years. A by-product plant for the manufacture of charcoal, containing 20 retorts and with a capacity for 160 cords of wood, has just been completed and is being tested this week. Plants for the distillation of the pyroligneous acid resulting from the charcoaling of this fuel and for the production of wood alcohol and acetate of lime therefrom are about ready. These will be the largest of their kind in the continent. With ore from its own mines, brought in its own ships, fuel from its own lands, carried on its own railway, a large government bounty, and the strong probability of an ample duty as further protection and an abundant Canadian market for many years to come, Mr. Clergue expects these to earn a large profit.

Any profit from these works will be very much increased by a contract now being closed with leading armor plate makers of England, whose representatives will be at the Sault next week to inspect the works. The facts of this contract require an explanation as to other portions of the metallurgical development of the company. The nickeliferous mines of the company contain an ore carrying sulphur, iron, nickel and copper. When the plan of building a sulphite mill was decided upon it was determined to endeavor to save sulphur fumes from these ores for use in this mill. In experiments to this end, and for the further purpose of utilizing the metallic residue of the ores, not less than half a million dollars was spent. The problem, which was a new one in metallurgy, was successfully solved. Today several thousand tons of ferro-nickel briquettes are stacked up at the furnaces ready to be used in the manufacture of nickeliferous pig iron. The ores are hand-sorted to eliminate copper, which is used otherwise. The sulphite mill is using liquor condensed from the fumes of roasting. In this operation, as all through this combination of industries, the effort has been to so utilize by-products that nothing of value may go to waste. While this result is thus briefly stated it is one of the triumphs of the day in scientific treatment of minerals, and is of the very highest importance, not only to these works, where so many newly invented and patented processes are in operation, but to all others similarly situated.

The contract above referred to, which will make the daily profit from a single charcoal stack of a value so great as to be scarcely believed, is for the sale of a portion of the pig iron resulting from the smelting of these ferro-nickel briquettes with hematite ores from the company's

mine. This iron is to be used in the manufacture of nickel steel for armor plate and material for British battleships. The Algoma Steel Co. itself has contracts for the manufacture of nickel steel for German steel makers.

A works is now under way here, the last plant to be undertaken, for the bessemerizing of copper matte from the Sudbury mines, and this should be in operation this year, making perhaps as high as 20,000 pounds copper daily.

The 1,800,000 acres of land selected by the company under its government grants is not pineries, but hard wood land, and is probably better adapted for agriculture than pineries. But single townships contain as high as 60,000,000 feet of splendid pine. This timber is scattered through the hardwood and it would be costly lumbering it but for the fact that the company takes everything on the ground, hard as well as soft woods. The pine is shipped over the company's Algoma Central Railway to the large saw mill at the Sault, the smaller sizes of hardwood are sent to the kilns and ovens for fuel for the manufacture of iron, and the larger hardwood logs are saved for the veneer mills. The pine timber is of a grade far better than is being cut around Lake Superior, either in Minnesota or Wisconsin, and a sale of the winter's product of the mill, some six or seven million feet, has just been made at $23 a thousand feet for all stock better than mill culls, buyer to pay duty. This is from $8 to $10 better than the equivalent grade would bring if cut from Minnesota logs, but the cost of logging and sawing the better timber is no more than that of the poorer, indeed is less, on account of the size of the better trees. This saw mill has run day and night all winter. It was started last fall and has been supplied with logs by the company's railway.

The land grant is covered with a splendid growth of birch, maple and other hard woods. Many townships cut from 40 to 50 cord of wood to the acre besides the larger logs fit for the veneer mill and the pine and spruce. The veneer mill was started a few days ago. It is the only one in Canada and is selling its product for months ahead to makers of fine furniture, pianos, sewing machines, etc., at prices that make a single tree worth a large sum. Were this mill not in operation these trees would bring $1 a cord as wood for the charcoal kilns. Now they are worth 100 times as much, and with little more work. This mill, which represents about $100,000 investment, is earning at the rate of $125,000 a year, net.

All the waste wood from these mills is used in the various plants of the company for fuel, thus displacing coal, and earning the mills a profit on a class of product that usually costs the mill man a large sum to get rid of.

Both the Algoma Central and the Manitoulin & North Shore railroads, of this company, are earning a profit and both are to be extended. They can earn a land grant of about 8,000,000 acres, of which nearly a fourth has been earned and selected.

The great water power canal on the Michigan side the Sault river will be in full operation shortly, as works for the manufacture of carbide of calcium and white metal are under construction and will be ready soon. These are by outside companies and buy power from the Michigan Lake Superior Power Co., another subsidiary company.

All buildings are substantial, many are fire proof and the chief materials of all are stone, steel and concrete. Their machinery is of late design and amply powerful. Many of their processes are unique and exclusive. Besides the industries referred to above the company runs steamships, ferries and street railway lines, makes cars, brick, machinery, etc., and carries on many industries. W. E.

The Ravena Iron Co., Ravena, N. Y., recently incorporated with a capital stock of $25,000, will manufacture steam and hot water fittings, flange unions, castings, etc.

The J. S. McCormick Co., of Pittsburg, manufacturers of and dealers in foundry equipments and supplies, have increased their capital stock from $50,000 to $150,000. The company is operating a plant at Mauch Chunk and one in Pittsburg and has doubled the capacity of both the past year. J. S. McCormick is president and T. E. Malone secretary and treasurer.

THE CARNEGIE STEEL CO. ABSORPTION.

In pursuance of its concentration policy, the United States Steel Corporation has merged the Carnegie Co., American Steel Hoop Co. and the National Steel Co.—all New Jersey corporations—into one company under the corporate name of Carnegie Steel Co. The old companies ceased to exist on Tuesday, March 31, the new company taking charge of affairs on Wednesday, April 1. The new Carnegie Steel Co. has been incorporated under the laws of New Jersey with $63,000,000 capital and stock in the new company in the ratio of $25 par value is to be issued for every $100 par value in the constituent companies. The Carnegie Co. was capitalized at $160,000,000 and also had outstanding $160,000,000 of 5 per cent bonds at the time of the formation of the United States Steel Corporation. The National Steel Co., organized under the laws of the state of New Jersey, had stock to the value of $59,000,000 outstanding and the American Steel Hoop Co. was capitalized at $33,000,000. The bonds and securities of these companies are all owned by the United States Steel Corporation.

Although no official statement is obtainable it is understood that the new company will only own and operate the mills, blast furnaces and all iron and steel manufacturing properties of the companies merged and that in line with the policy of concentration one company or department will be organized to operate the ore properties of the steel corporation, another will have full charge of steamship operations, and another will have charge of operating all the coke properties. With regard to operating the coke properties much work looking towards concentration has been done and it is reported that shortly the H. C. Frick Co. will take over all the coke properties now operated through the H. C. Frick Coke Co., but at present under different corporate names.

Owing to the similarity of the lines of material produced by the three steel companies merged, about one year ago the Carnegie Steel Co. practically took them over, the same officers serving for all three and the offices of the National Steel and the American Steel Hoop Companies were combined with those of the Carnegie Steel Co. in the Carnegie Building, Pittsburg, at that time. A similar combination of the sales offices of the three companies took place at that time. It is not probable that the American Steel & Wire Co., National Tube Co. and the American Bridge Co. will lose their individuality, owing to the different lines engaged in by these companies, but there is a movement on foot for the merger of the American Tin Plate Co. and the American Sheet Steel Co. in the very near future.

The applicants for the charter of the Carnegie Steel Co., filed last week, are C. M. Schwab, W. E. Corey, E. H. Gary, W. W. Blackburn and Thomas Murray. The following announcement covering the merger of the three companies was issued by the Carnegie Steel Co., under date of March 31:

The Carnegie Co., National Steel Co. and American Steel Hoop Company, all of New Jersey, have become merged under the corporate name of Carnegie Steel Co. The business heretofore conducted under the names of The Carnegie Co., National Steel Co. and American Steel Hoop Co., as well as that of Carnegie Steel Co., will, on and after April 1, 1903, be conducted under the name of Carnegie Steel Co. The merged company will collect all accounts due the companies named, and will make payment of their indebtedness. The officers of the company are as follows: W. E. Corey, president; H. P. Bope, first vice president and general manager of sales; W. W. Blackburn, second vice president and secretary; W. C. McCausland, treasurer; W. R. Conrad, assistant treasurer; Jas. J. Campbell, auditor and assistant secretary. Other officials are same as have been serving under name of Carnegie Steel Co.

CARNEGIE STEEL CO.,
W. E. Corey, President.
W. W. Blackburn, Secretary.

The Machine Shop and Foundry of the Vilter Manufacturing Co.

Milwaukee is of course best known through its extensive brewing interests, but this industry is by no means the only basis for its claim for commercial prominence. A number of machine tool builders are located there and in the matter of engine building the output of Corliss engines has long since passed the productive record established elsewhere. These machines are made in very large quantities in all sizes up to the immense units of the Metropolitan Street Railway Co. of New York, and these demands for material have placed the district in the position of being one of the largest consumers of foundry iron in the United States. The large percentage of heavy machinery and jobbing castings required in the manufacturing interests of the city demand well trained molders just as much as the character of the machine work needs excellent machinists and the class of mechanics employed therefore stands very high in general skill.

Among the leading manufacturers of Milwaukee is the Vilter Mfg. Co., which has one of the largest and best equipped plants of its kind in the country. This had its beginning in 1867 when Peter Weisel, started the business in a very small way, being joined by Mr. Ernest Vilter in 1879, the Weisel & Vilter Mfg. Co. being incorporated in 1886. Mr. Vilter died in 1888, when the business was carried on by his sons, who acquired Mr. Weisel's interests and changed the name of the corporation to that of the Vilter Mfg. Co. in 1893. During the great fire of 1892, when much of the city was destroyed, the company suffered the loss of its entire plant, when its operations were transferred to the present site, which is occupied by a machine shop, 80x434 feet, two stories in height, equipped with modern tools and two 40-foot span electric traveling cranes of 15 tons capacity each. The store house and material shop is three stories in height, 60x60 feet, and the pipe shop adjoining, 60x120 feet. In the latter all coils and pipe connections are made for the pipe systems employed in refrigerating and ice making plants. The blacksmith shop is 60x60 feet and the stock room connected therewith 45x60 feet. Some distance from this is the power house 60x100 feet and the foundry 110x270 feet. There has also lately been added a carpenter shop 44x144 feet, two stories in height, which is used for repairing flasks and making the woodwork for ice tanks and other fixtures.

The power plant is equipped with a 150 k. w. Northern Electric Co. generator belted to a 24x48 single cylinder engine of 450 h. p. and there are also two duplex air compressors.

The machine shop as well as the foundry is built of brick and steel and is exceptionately well lighted. The present crowded condition of the shop as shown by the illustrations does not permit the most convenient handling of the work, but the lofty height, the convenience of good crane facilities, portable tools, etc., permit the work to be conducted with as little interference among the workmen as may well be expected. The management believe thoroughly in the advantage of system as a most important factor in economical manufacture, and this anticipation of contingencies is shown not less plainly in the method of handling the happily few accident cases which may come up from time to time. Attention to this feature will be directed elsewhere in more detail.

FIG. 1.—VIEW IN MACHINE SHOP OF VILTER MANUFACTURING CO.

The main foundry, having a span of 60 feet, is served by two electric traveling cranes of 60,000 pounds and 15,000 pounds capacity while the side floor is provided with trackage intended for a 15-ton locomotive crane of the Industrial Co.'s construction. The crane has a capacity of 15 tons at a radius of 16 feet and 10 tons at 20 feet. There are several features connnected with the arrangement of the cupolas and stock-yard, which are well worth describing. In the majority of foundries the cupolas are so located that the smoke, steam and dust arising from their operation find their way into the foundry proper.

At the plant of the Vilter Mfg. Co. these annoyances are avoided by shutting off the cupola room through counterweighted doors, clearly shown in the accompanying illustration. Naturally these doors may be left open, except during such periods as when ladles are being dried, the cupola bottom dropped or other work being done, which makes smoke or steam. There is another thing connected with the cupolas as here located that should appeal with special force to every foundryman who likes to have his shop as clean as possible. This is the method adopted of handling iron in large or small ladles. In most foundries, when large ladles have to be filled, a hole has to be dug in the floor, and the way small ladles of iron are caught is in many instances absolutely dangerous, and the wonder is that molders and helpers do not receive worse burns than they do. In the foundry of the Vilter Mfg. Co., the cupola spout is located high enough so that the largest ladle may be inserted under same without disturbing the foundry floor in any particular. This of course leaves the spout too high to permit of tapping iron into smaller ladles after the ordinary "catch over" fashion. To accommodate work which has to be poured with small ladles, a mixing ladle is mounted on a permanent carriage, and attached to the standards, supporting the ladle, are fastened, at a convenient height, supports, upon which the shank of the bull ladle may rest while it is being filled. Thus there is no slopping or spilling of iron and the neat surroundings of the cupolas is a distinct revelation to those who have been accustomed to the ill-kept conditions of older shops. Of course the mixing ladle with its load of metal may be run to one side of the track and emptied at leisure, while a larger ladle is being filled for heavy castings. Other ladles of different capacities may also be placed on trucks and run under the cupola spout and filled and shifted to the side floor or other parts of the foundry, thus giving the electric traveling crane a chance to be used for other purposes, instead of being tied up permanently with a ladle.

In the handling of material for the cupolas the Vilter Mfg. Co. has also introduced improvements calculated to avoid errors and reducing the cost of labor. An industrial track connects all parts of the stock yard, special cars being provided for handling iron and coke. The tracks do not extend beyond the elevator as the floor of the charging platform is covered with diamond steel plates and the cars may with ease be operated on the part of same without the necessity of providing trackage of any kind. Our illustrations show the designs of cars employed, and it should be noted that the charges of iron are made up on each car, and by a tilting arrangement charged directly into the cupola without further handling. As will be seen in the illustration the cupola is furnished with a counterweighted door, moving in vertical guides, and a kind of a special shelf is also attached to the cupola, which protects the lining against jars it might receive from the spout of the charging cars, when the latter is being tilted. These cars are light enough so that they may readily be "jumped off" the track and run out of the way when not needed. A scale house has been placed in the yard so that weights may readily be ascertained without loss of time or the retracing of any movement on the handling of material.

Where large molds are to be made in the floor the foundries of this vicinity employ a cast iron curbing, the appearance of which is shown in the illustration. This fences off the mold proper and avoids many of the careless accidents, which are apt to occur where the mold is made in the floor without any definite boundary. Again, this form of curbing permits of the mold being made within a relatively smaller compass and it may be extended above the floor any distance which is considered convenient. The added security which is obtained in more ways than one compensates for the time required to adjust the curbing.

The core ovens at the Vilter Mfg. Co.'s foundry are located at one end of the foundry and are large and roomy. All firing is done at the rear, where are also located the air hoists by which the doors of the ovens are operated. This is a rather novel application of the air hoist, although none will deny that it gives the very best of satisfaction. It is argued that the relatively small cost of one of these air hoists, by which any boy may open or close the doors, will soon pay for itself, through the time saved.

FIG. 2.—VIEW IN MACHINE SHOP OF VILTER MANUFACTURING CO.

The foundry of the Vilter Mfg. Co. is heated by hot air, although it will be noted from the illustrations that there is an entire absence of pipes, so common where this system is adopted. In this instance the heat is distributed through underground conduits and enters the building through registers placed in the walls of same, thus giving the colder parts of the shop the benefit of the greatest volume of heat, whereas in places where the heat is distributed through a central pipe, these parts of the shop may have a low temperature, although the balance of the works may be fairly comfortable. The greater part of the works of the Vilter Mfg. Co. has been in continuous operation night and day for seven years, and the output has found its way to all parts of the world. In addition to manufacturing Corliss engines the principal product of the Vilter Mfg. Co. is complete equipments for ice making and refrigerating plants, also brewers' and bottlers' machinery. The company employs about 450 men.

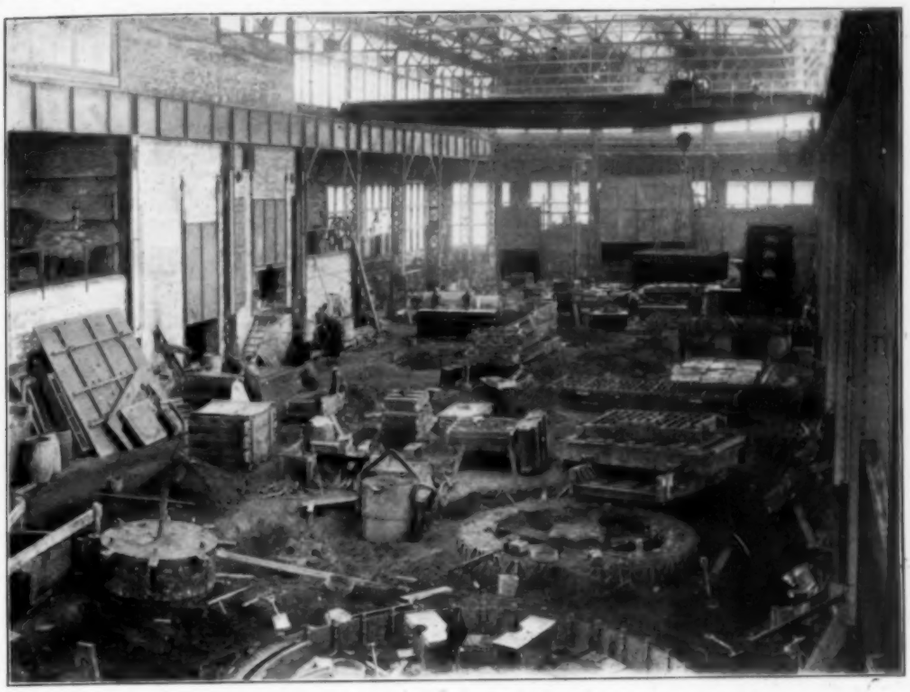


FIG. 3.—GENERAL VIEW OF MAIN MOLDING FLOOR IN THE VILTER FOUNDRY.

The Risdon Iron Works, San Francisco, has granted its employes a nine-hour working day and a 10 per-cent increase in wages. When the men employed at the Union Iron Works, San Francisco, heard of this move they prepared a petition signed by the 3,000 employes, asking that a similar concession be granted to them. President Dood of the Union Iron Works states that the request of the men will soon be granted.

The Vincent Valve Co., Sandusky, O., will build an addition to its plant and put in considerable new machinery.

The Malleable Iron Industry of the United States and Canada.

Perhaps no branch of the foundry trade can show as rapid an increase in capacity as the malleable industry. The past three or four years have witnessed an increased activity in this line; and in view of frequent inquiries for particulars in regard to the extent of the manufacture of malleable iron in the United States and Canada, append herewith a list of the concerns engaged therein on Jan. 1, 1903, arranged according to States. We also show the class of work turned out by each, as well as the daily capacity of individual plants where this has been obtainable. Where the capacity is followed by an asterisk (*), this indicates that the figures quoted are estimated.

Alabama.

Southern Car & Foundry Co., Anniston, Ala. Principal output, car castings, all consumed by the company's plants. Daily capacity, 15 tons.

Connecticut.

Malleable Iron Fittings Co., Brantford, Conn. Product, pipe fittings. Daily capacity, 30 tons.

Bridgeport Malleable Iron Co., Bridgeport, Conn. Output, general castings. Daily capacity, 40 tons.

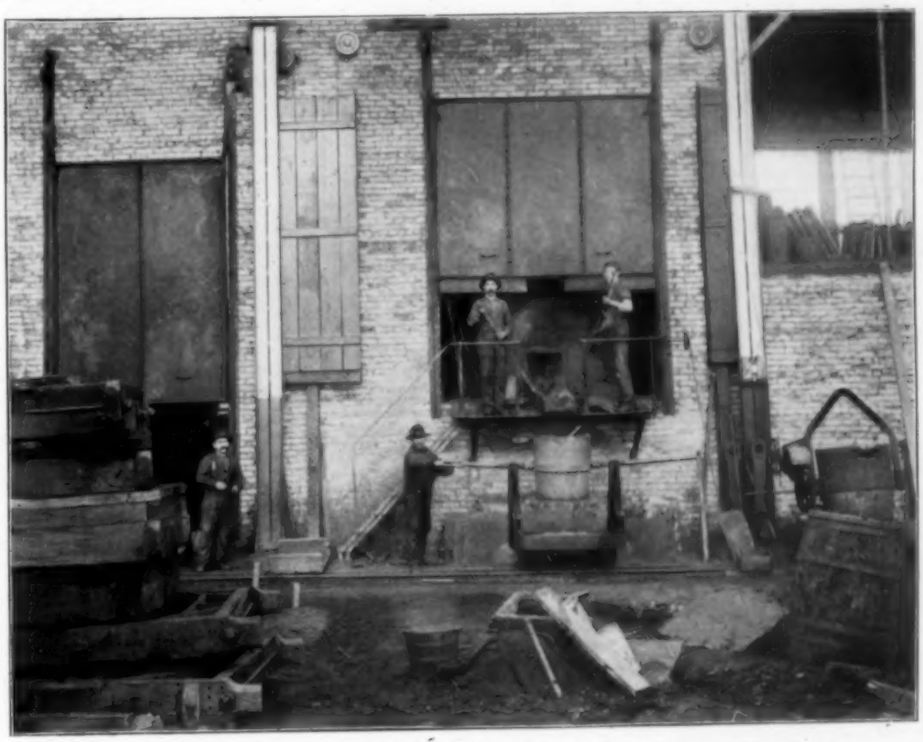


FIG. 4.—ARRANGEMENT OF CUPOLA AND METHOD OF HANDLING MELTED IRON.

Walter W. Woodruff & Sons Co., Mount Carmel, Conn. Output, carriage hardware. Daily capacity, 2 tons.

Naugatuck Malleable Iron Co., Naugatuck, Conn. Output, general castings. Capacity, 35 tons daily.

Malleable Iron Works, New Britain, Conn. Output, general castings. Capacity, 5 tons per day.

North & Judd Mfg. Co., New Britain, Conn. Output, hardware castings, consumed by company. Daily capacity, 6 tons.

Vulcan Iron Works, New Britain, Conn. Output, general castings. Capacity, 7 tons daily.

The W. & E. T. Fitch Co., New Haven, Conn. Principal output, saddlery hardware castings, consumed by company. Capacity per day, 2½ tons.

FIG. 5.—CAST IRON CURBING EMPLOYED WHERE LARGE MOLDS ARE MADE IN THE FLOOR.

Andrew Terry Co., Terryville, Conn. Product, light hardware castings. Daily capacity, 4 tons.

Delaware.

Wilmington Malleable Iron Co., Wilmington, Del. Output, general castings. Capacity, 20 tons per day. (Now being enlarged.)

Illinois.

Parlin & Orendorff Co., Canton, Ill. Product, agricultural castings, of which 75 percent is consumed by the company. Capacity, 24 tons daily.

Chicago Malleable Castings Co., West Pullman (Chicago), Ill. Output, railroad, agricultural and general castings. Capacity per day, 30 tons.

Crane Co., Chicago, Ill. Product, pipe fittings and specialties. Capacity, 50 tons daily.

Illinois Malleable Iron Co., Chicago, Ill. Output, pipe fittings and specialties. Capacity, 15 tons daily, which will shortly be increased to 25 tons.

International Harvester Co. (Deering Division), Chicago, Ill. Output, agricultural castings, consumed by the company. Daily capacity, 65 tons. (See also Springfield, Ohio.)

International Harvester Co. (McCormick Division), Chicago, Ill. Product, agricultural castings, consumed by company. Capacity, 40 tons daily. (See also Springfield, Ohio.) Extentensions are now under way which will practically double present capacity.

FIG. 6.—AIR HOISTS AT REAR OF OVENS FOR OPERATING CORE OVEN DOORS.

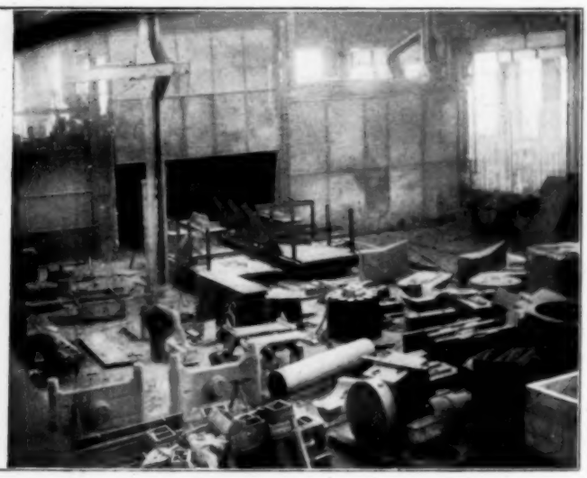


FIG. 7.—CORE OVENS AND FLOOR FOR HEAVY CORES.

National Malleable Castings Co., Chicago, Ill. (See also Toledo, O., Cleveland, O., and Indianapolis, Ind.) Output, general castings. Capacity of two old foundries and Grant works, 230 tons daily.*

Railroad Supply Co. (Central Malleable Works), Chicago, Ill. Principal output, railway castings. Capacity, 20 tons daily.

American Malleable Iron Co., Chicago Highlands, Ill. (Main office, Marquette Bldg., Chicago.) Principal product, railroad and agricultural castings. Daily capacity, 30 tons.

Central Malleable Iron Co., Decatur, Ill. Output, agricultural castings. Daily capacity, 20 tons.

Missouri Malleable Iron Co., East St. Louis, Ill. Product, general castings. Capacity, 50 tons daily.

Forster, Waterbury & Co., Franklin Park, Ill. Output, link chains, malleable specialties and general castings. Capacity, 25 tons daily.

Western Steel Car & Foundry Co. (Lessees, Illinois Car & Equipment Co.), Hegewisch (Chicago), Ill. Product, car castings, consumed by company. Daily capacity, 10 tons.

William E. Pratt Mfg. Co., Joliet, Ill. (Main office, Chicago.) Output, hardware specialties and general castings. Daily capacity, 10 tons.

Western Tube Co., Kewanee, Ill. Product, pipe fittings. Daily capacity, 20 tons.

American Car & Foundry Co., Madison, Ill. Output, car castings, consumed by the company. Capacity, 12 tons per day. (See also St. Charles, Mo.)

Union Malleable Iron Co., Moline (East Moline), Ill. Output, general castings. Capacity, 30 tons daily.

Ellington Mfg. Co., Quincy, Ill. Output, general castings. Daily capacity, 10 tons.

Rockford Malleable Iron Co., Rockford, Ill. Chief product, agricultural castings. Capacity, 15 tons daily.

Moline Malleable Iron Co., St. Charles, Ill. Output, general castings. Daily capacity, 15 tons.

Indiana.

National Malleable Castings Co., Indianapolis, Ind. Product, general castings. Capacity, 60 tons daily.* (See also Chicago, Ill., Toledo, O., Cleveland, O.)

Marion Malleable Iron Co., Marion, Ind. Output, general castings. Capacity, 20 tons daily.

Whiteley Malleable Castings Co., Muncie, Ind. Output, agricultural and railroad castings. Capacity, 75 tons daily.

Oliver Chilled Plow Works, South Bend, Ind. Output, plow castings, consumed by the company. Capacity, 15 tons daily.

South Bend Malleable Iron Co., South Bend, Ind. Product, general castings. Daily capacity, 15 tons.

Maryland.

Baltimore Malleable Iron & Steel Casting Co. (P. Ken-

nedy, owner), Baltimore, Md. Product, general castings. Capacity, 25 tons daily.

Massachusetts.

Belcher Malleable Iron Co., Easton, Mass. Product, light castings. Capacity, 2 tons daily.

Arcade Malleable Iron Co., Worcester, Mass. Product, general castings. Capacity, 5 tons per day.* (Also own Worcester Malleable Iron Co.)

Worcester Malleable Iron Works (Arcade Malleable Iron Co., owners), Worcester, Mass. Product, general castings. Daily capacity, 4 tons.*

Albion Malleable Iron Co., Albion, Mich. Output, agricultural and general castings. Capacity, 25 tons daily.

Michigan.

Michigan Malleable Iron Co., Delray, Mich. (near Detroit). Product, railway and agricultural castings. Capacity, 75 tons daily.

Albion Malleable Iron Co., Albion, Mich. Output, agricultural and general castings. Capacity, 25 tons daily.

Michigan Malleable Iron Co., Delray, Mich. (near Detroit). Product, railway and agricultural castings. Capacity, 75 tons daily.

Buhl Malleable Co., Detroit, Mich. Output, railroad, agricultural and general castings. Capacity, 20 tons daily.*

Grand Rapids Malleable Iron Co., Grand Rapids, Mich. Product, general castings. Capacity, 20 tons daily.

Standard Malleable Iron Co., Muskegon, Mich. Product, general castings. Capacity, 20 tons daily.

FIG. 8.—A PART OF THE VILTER MFG. CO.'S PATTERN SHOP.

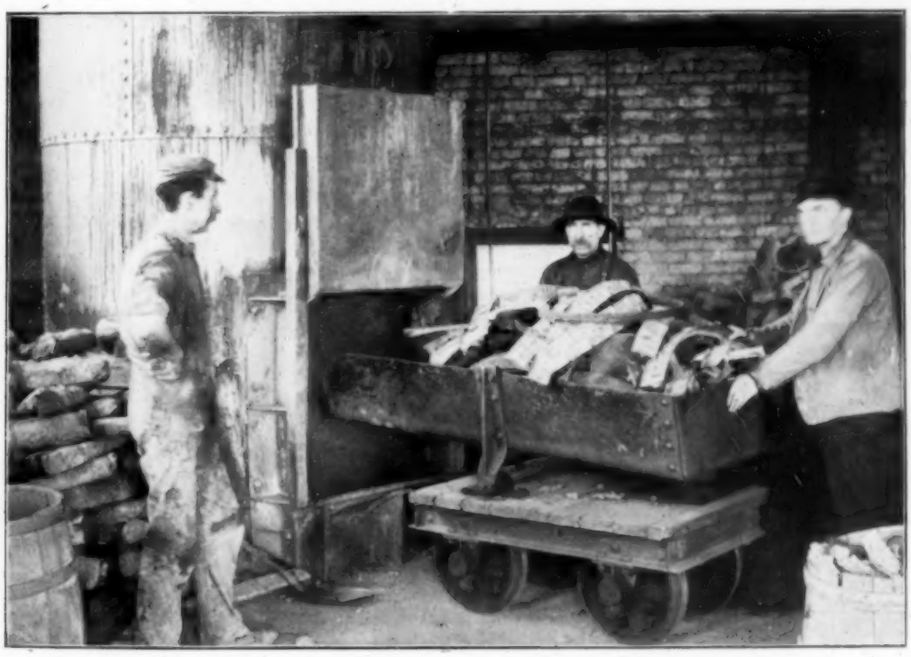


FIG. 9.—CHARGING CAR READY TO DISCHARGE ITS CONTENTS INTO THE CUPOLA.

Port Huron Malleable Co., Port Huron, Mich. Product, general castings. Capacity, 10 tons daily.

Minnesota.

Minnie Harvester Co., St. Paul, Minn. Product, agricultural and railroad castings. Capacity, 40 tons daily.

Missouri.

American Car & Foundry Co., St. Charles, Mo. Output, car castings, consumed by the company. Daily capacity, 15 tons. (See also Madison, Ill.)

New Hampshire.

Laconia Car Co., Laconia, N. H. (Main office, Boston, Mass.) Output, general castings. Daily capacity, 6 tons.

New Jersey.

Arthur E. Barlow, Newark, N. J. Output, general castings. Capacity, 4 tons daily.

S. J. Meeker, Newark, N. J. Product, general castings. Capacity, 8 tons daily.

Trenton Malleable Iron Co., Trenton, N. J. Product, general castings.

New York.

Page & Sill (Albany Malleable Iron Works), Albany, N. Y. Output, general castings. Capacity, 5 tons daily.

D. M. Osborne & Co., Auburn, N. Y. Output, agricultural castings, consumed by the company. Capacity, 25 tons daily.

Acme Steel & Malleable Iron Works (E. G. Felthousen, owner), Buffalo, N. Y. Product, general castings. Capacity, 20 tons daily.

Pratt & Letchworth Co. (Buffalo Malleable Iron & Steel Works), Buffalo, N. Y. Product, railway castings. Capacity, 45 tons daily. (See also Brantford, Ontario.)

Gould Coupler Co., Depew, N. Y. Product, car couplers, journal boxes and draft arms. Daily capacity, 90 tons.

Deposit Foundry Co., Deposit, N. Y. (George M. Ballard, Newark, N. J., owner.) Output, harness and general castings. Capacity, 2 tons daily.

Walter A. Wood Mowing & Reaping Mach. Co., Hoosick Falls, N. Y. Product, agricultural castings, consumed by the company. Daily capacity, 25 tons.*

Lancaster Malleable Iron Works, Lancaster, N. Y. Product, general castings. Capacity, 20 tons daily.

Oriskany Malleable Iron Co., Oriskany, N. Y. Product, general castings. Capacity, 4½ tons daily.

Isaac G. Johnson Co., Spuyten Duyvil, N. Y. Output, general castings. Capacity, 15 tons daily.

Frazer & Jones Co., Syracuse, N. Y. Product, saddlery and hardware castings. Capacity, 9 tons daily.

Syracuse Malleable Iron Works, Syracuse, N. Y. Output, general castings. Capacity, 10 tons daily.*

Torrance Iron Co., Troy, N. Y. Product, general castings. Capacity, 5 tons daily.*

Troy Malleable Iron Co., Troy, N. Y. Output, general and railroad castings. Capacity, 10 tons daily.*

Westmoreland Malleable Iron Co., Westmoreland, N. Y. Output, general castings. Capacity, 4 tons daily.

Ohio.

Canton Malleable Iron Co., Canton, O. Product, general castings. Capacity, 18 tons daily.

Elbel Co., Canton, O. Product, saddlery and harness, hardware castings, consumed by the company. Capacity, 5 tons daily.

Haven Malleable Casting Co., Cincinnati, O. Output, general castings. Capacity, 10 tons daily.

Chisholm & Moore Mfg. Co., Cleveland, O. Product, general castings. Capacity, 15 tons daily.

Eberhard Mfg. Co., Cleveland, O. Product, carriage, saddlery and hardware specialties. Capacity, 40 tons daily.

National Malleable Casting Co., Cleveland, O. Product, agricultural, railway and general castings. Capacity, 60 tons daily.* (See also Toledo, O., Indianapolis, Ind., Chicago, Ill.)

Buckeye Malleable Iron & Coupler Co., Columbus, O. Principal output, car couplers and other railway castings. Capacity, 50 tons daily.

Columbus Malleable Iron Co., Columbus, O. Output, general castings. Capacity, 15 tons daily.

P. Hayden Saddlery Hardware Co., Columbus, O. Output, harness and saddlery hardware. Daily capacity, 3 tons.

Ohio Malleable Iron Co., Columbus, O. Product, chain link, car couplers and medium weight castings. Capacity, 20 tons daily.

Dayton Malleable Iron Co., Dayton, O. Product, agricultural and general castings. Capacity, 75 tons daily.

Acme Mfg. Co., Lancaster, O. Product, general castings. Capacity, 5 tons daily.

Marion Malleable Iron Co., Marion, O. Product, general castings. Capacity, 5 tons daily.

International Harvester Co. (Champion Division), Springfield, O. Product, agricultural castings, consumed by the company. Capacity, 50 tons daily. (See also Chicago.)

Springfield Malleable Iron Co., Springfield, O. Product, railroad, agricultural and general castings. Capacity, 35 tons daily.

National Malleable Castings Co., Toledo, O. Product, agricultural, railway and general castings. Capacity, 60 tons daily.* (See also Cleveland, O., Indianapolis, Ind., Chicago, Ill.)

Zanesville Malleable Iron Co., Zanesville, O. Product, general castings. Capacity, 20 tons daily.

Pennsylvania.

Altoona Foundry & Machine Co., Altoona, Pa. Product, railroad and general castings. Capacity, 10 tons daily.

Berwick Malleable Co., Berwick, Pa. Output, general castings. Capacity, 20 tons daily.

Sterlingworth Railway Supply Co., Easton, Pa. Product, car truck and bolster castings, consumed by the company. Capacity, 20 tons daily.

Erie Malleable Iron Co., Erie, Pa. Product, general castings. Daily capacity, 60 tons.

Jarecki Mfg. Co., Erie, Pa. Product, fittings and hardware specialties. Daily capacity, 18 tons.

Franklin Rolling Mill & Foundry Co., Franklin, Pa. Output, special castings consumed by company and general castings to order. Capacity, 10 tons daily.

Huntingdon Malleable Iron Co., Huntingdon, Pa. Output, general castings. Capacity, 6 tons daily.

Fort Pitt Malleable & Gray Iron Works, McKee's Rocks, Pa. (Main office, Pittsburg, Pa.) Product, general castings. Capacity, 20 tons daily.

Pennsylvania Malleable Co., McKee's Rocks, Pa. Output, car castings. Capacity, 80 tons daily.

Meadville Malleable Iron Co., Meadville, Pa. Output, general castings. Daily capacity, 20 tons.

Thos. Devlin & Co. (National Hardware & Malleable Iron Works), Philadelphia, Pa. Output, fittings and hardware specialties. Capacity, 10 tons daily. (See also "New Construction.")

Stanley G. Flagg & Co., Philadelphia, Pa. Product, malleable pipe fittings and general castings. Capacity, 10 tons daily. (See also Pottstown, Pa.)

Philadelphia Hardware & Malleable Iron Works, Philadelphia, Pa. Product, hardware specialties. Capacity, 8 tons daily.

McConway & Torley Co., Pittsburg, Pa. Product, car couplers and general castings. Daily capacity, 65 tons.

Pittsburg Malleable Iron Co., Pittsburg, Pa. Product, general castings. Capacity, 30 tons daily.

Stanley G. Flagg & Co., Pottstown, Pa. Product, malleable pipe fittings and general castings. Daily capacity, 20 tons. (See also Philadelphia, Pa.)

Norway Iron & Steel Co., York, Pa. Output, general castings. Capacity, 50 tons daily.

York Mfg. Co., York, Pa. Output, general castings. Daily capacity, 10 tons.

Rhode Island.

Rhode Island Malleable Iron Works, Hills Grove, R. I. Product, general castings. Daily capacity, 10 tons.

Tennessee.

Ross-Meehan Foundry Co. (Southern Malleable Iron Works), Chattanooga, Tenn. Output, railroad and agricultural castings. Capacity, 30 tons daily.

West Virginia.

West Virginia Malleable Iron Co., Point Pleasant, W. Va. Output, general castings. Capacity, 25 tons daily.

Wisconsin.

Beaver Dam Malleable Iron Co., Beaver Dam, Wis. Product, railroad and agricultural castings. Capacity, 20 tons daily.

Milwaukee Malleable & Gray Iron Works, Milwaukee, Wis. Product, general castings. Capacity, 10 tons daily.

Northwestern Malleable Iron Co., Milwaukee, Wis. Product, agricultural and railroad castings. Daily capacity, 80 tons.

West Allis Malleable Iron & Chain Belt Co., West Allis (Milwaukee), Wis. Product, detachable chain belting and accessories, and custom work. Daily capacity, 10 tons.

Wisconsin Malleable Iron Co., Milwaukee, Wis. Output, general castings. Capacity, 50 tons daily.

Ferris Clevis Co., Oshkosh, Wis. Output, patented clevises. Capacity, 5 tons daily.

Belle City Malleable Iron Co., Racine, Wis. Product; agricultural and railroad castings. Capacity, 30 tons daily.

Lakeside Malleable Iron Co., Racine, Wis. Product, general castings. Daily capacity, 18 tons.

Racine Malleable & Wrought Iron Co., Racine, Wis. Output, saddlery hardware castings. Capacity, 20 tons daily.

Stowell Mfg. & Foundry Co., South Milwaukee, Wis. Product, agricultural, wagon malleables and hardware specialties. Capacity, 20 tons daily.

Waukesha Malleable Iron Co., Waukesha, Wis. Output, general castings. Capacity, 15 tons daily.

Canada.

Pratt & Letchworth Co., Brantford, Ont. Output, agricultural and railroad castings. Capacity, 25 tons daily. (See also Buffalo, N. Y.)

Taylor-Forbes Co., Guelph, Ont. Product, hardware specialties and general castings. Capacity, 2 tons daily.

Patrick Kyle, Merrickville, Ont. Product, general castings. Capacity, 3 tons daily.

Ontario Malleable Iron Co., Oshawa, Ont. Output, general castings. Capacity, 20 tons daily.

St. Catharines Malleable Iron Works (McKinnon Dash & Metal Co., owners), St. Catharines, Ont. Product, hardware specialties and general castings. Capacity, 10 tons daily.

Smiths Falls Malleable Iron Co. (W. H. Frost, owner), Smiths Falls, Ont. Product, general castings. Daily capacity, 20 tons.

Walkerville Malleable Iron Co., Walkerville, Ont. Product, railroad and agricultural castings. Daily capacity, 25 tons.

In tabulated form the malleable industry makes the following showing:

	Number of Works.	Daily Capacity, Tons.
Alabama	1	15
Connecticut	9	131½
Delaware	1	20
Illinois	20	721
Indiana	5	185
Maryland	1	25
Massachusetts	3	11
Michigan	6	170
Minnesota	1	40
Missouri	1	15
New Hampshire	1	6
New Jersey	3	22
New York	15	289½
Ohio	17	486
Pennsylvania	18	467
Rhode Island	1	10
Tennessee	1	30
West Virginia	1	25
Wisconsin	11	278
Canada	7	105

Total, 123 works, with a daily capacity of 3,052 tons.

All of the works mentioned above are in active operation and according to the figures given represent an annual capacity of 915,600 tons. It is well known, however, that even under the best of management no concern ever attains its maximum capacity and the actual output of malleable castings in the United States and Canada is probably between 750,000 and 800,000 tons. The work capacity as here used should in no way be mistaken for output, as it is evident that many foundries have rated their capacity according to the amount of iron they are capable of melting or annealing. With a heavy class of castings a foundry may show nearly double the output it could if making light castings, and the tonnage it is capable of handling therefore depends upon factors which are not readily ascertainable.

The three States of Illinois, Ohio and Pennsylvania produce over 54 percent of the total tonnage of malleable iron. If we add the States of New York, Wisconsin and Indiana, we cover more than 80 percent of the total output malleable castings.

In addition to the concerns listed above and in active operation there should be mentioned:

New Constructions.

St. Paul Foundry Co., St. Paul, Minn. A malleable iron department with a capacity of 25 tons per day is expected to be in operation by the end of the year.

St. Louis Malleable Casting Co., St. Louis, Mo. Plant under construction and will be occupied about May 1 of this year. Output, general castings. Capacity, 40 tons daily.

Thos. Devlin & Co., Burlington, N. J. Plant nearly completed and expected to be ready for operations early in the year. Output, fittings and hardware castings. Capacity, 20 tons daily. (See also Philadelphia, Pa.)

Columbia Machine Works & Malleable Iron Co., Brooklyn, N. Y., intends to add a malleable department.

The Ohio Brass Co., Mansfield, O., has under consideration the building of a malleable plant with from 15 to 20 tons daily capacity.

Rhodes, Curry & Co., Amherst, N. S., Canada, may possibly erect a malleable plant during the year 1903.

Canadian Pacific Ry. Co. has planned a malleable department to be operated in connection with the new shops of the company now being erected at Hochelaga, a suburb of Montreal, P. Q.

Among other companies incorporated to manufacture malleable castings are:

The Colorado Foundry Co., Pueblo, Col.

Chicago Heights Malleable Iron Co., Chicago Heights, Ill.

National Malleable Iron & Steel Perfection Coupler Co. (Office, 420 Walnut St., Philadelphia.) Plant being fitted up at Spring City, Pa.

DISC GRINDING ATTACHMENT FOR NEW YANKEE DRILL GRINDERS.

The illustration shows a grinding attachment the Wilmarth & Morman Co., of Grand Rapids, Mich., have recently designed for their drill grinders.

As will be seen, the arrangement is similar to that used in disc grinders, and consists of a table and its supports, capable of oscillating on a stud, and counter-balanced to keep right side up.

Two tables are furnished: a flat one with a ridge at one side to square up work, and a V-shaped table for rounds, etc. These tables are quickly interchangeable without the use of a wrench and are adjustable for angles in all directions and cutters, chasers, punches, dies, gibs, nuts, keys and a multitude of small parts that would otherwise be

DISC GRINDING ATTACHMENT FOR DRILL GRINDER.

planed, milled or filed may readily be ground thereon.

A collar, adjustable on the stud, limits the movement of the table toward the wheel and a shield keeps them free from grinder dust.

A cupped wheel is used and as the work is moved clear across its face there is no tendency for it to wear out of true or groove so that an emerypaper-faced steel disc would have no advantages over an emery wheel in this respect; the emery paper and the time required to cement it on would probably cost more than the same amount of abrasive in a cupped emery wheel. It should be noticed that when the wheel has been worn back to the web a plain wheel remains, which may then be used up elsewhere.

A further factor in causing the adoption of a cupped wheel rather than a disc on this machine is that the presence of the drill grinder wheel (and these wheels run slower than emery wheels for other purposes) would prevent a disc being run at the high rate of speed at which it is most efficient, unless it be made very large.

The makers are prepared to furnish this attachment on a column without the drill grinder but with a plain wheel and rest or surface grinder instead. This latter arrangement is intended for shops already equipped with drill grinders.

AN ELECTRIC SKIP HOIST FOR BLAST FURNACE.

The changes in blast furnace construction and operation caused by the substitution of machine filling and dumping devices for the old hand filling arrangements have brought into use the automatic skip hoisting engine. Several types of this apparatus are manufactured by the Otis Elevator Co., of Yonkers, N. Y., in which the motive power may be either steam or electricity. Inasmuch as most modern furnace plants use all the steam they produce (even though the waste gases are utilized for its generation), economy in the consumption of steam is desirable. Therefore electric hoists have come into favor of late, because money can be saved by using steam generated from waste gas to produce electric power, which in turn becomes available for the operation of many auxiliaries, among them the furnace hoists.

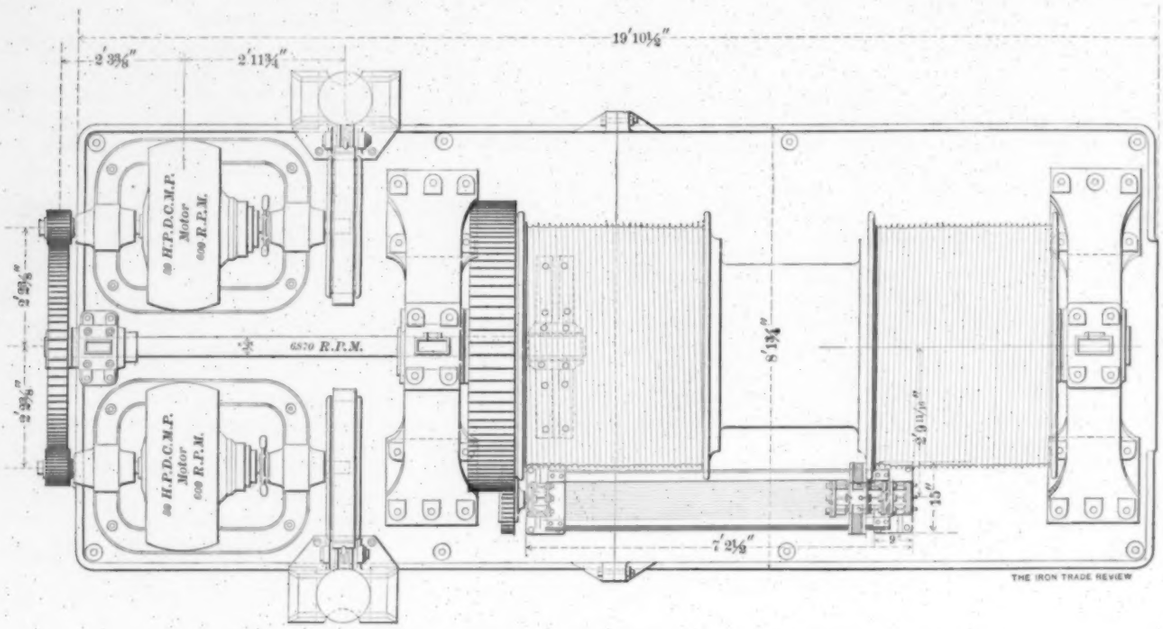


FIG. 1.—PLAN OF TWO-MOTOR HOIST FOR BLAST FURNACES AT ILLINOIS STEEL CO.'S PLANT.

The service demanded of blast furnace hoists is among the most severe of all elevator work. The loads vary from 3,000 pounds to 20,000 pounds, and in some instances when single skip hoists are used, the empty descending bucket is as much as 5,000 pounds lighter than the counterbalance, giving a variation of load of from minus 5,000 pounds to plus 15,000 pounds. The speed for the average furnace is about 200 feet; but in the case of the single skip hoist, speeds over 500 feet per minute are in use. While the furnace is in blast, the operation of the hoist must be absolutely uninterrupted for twenty-four hours a day and every day in the year.

Two general types of machines are in use. The first has a single compound motor, accelerated partly by cutting out ohmic resistance, and partly by short circuiting the series field. The successive steps in the acceleration are accomplished either by mechanically operated switch, or by electrically operated switches controlled by the counter electromotive force of the motor. The method of cutting out the starting resistance by the counter electromotive force of the motor gives the quickest possible acceleration with a predetermined limit of accelerating current, the light load accelerating quickest, and the heavy load slower; and the accelerating current cannot exceed the predetermined amount.

In the single motor machine the retardation and the final stop are made automatically by inserting resistance in series with the motor armature and across the terminals of the armature; a series of magnets actuated by the electromotive force of the armature vary automatically the amount of resistance as the load varies, in such proportion that the motor is retarded to a slower speed with a load descending than with a load ascending. Thus, when finally the power is cut off and both a dynamic and mechanical brake are applied, the varying loads automatically are brought to rest at the same position.

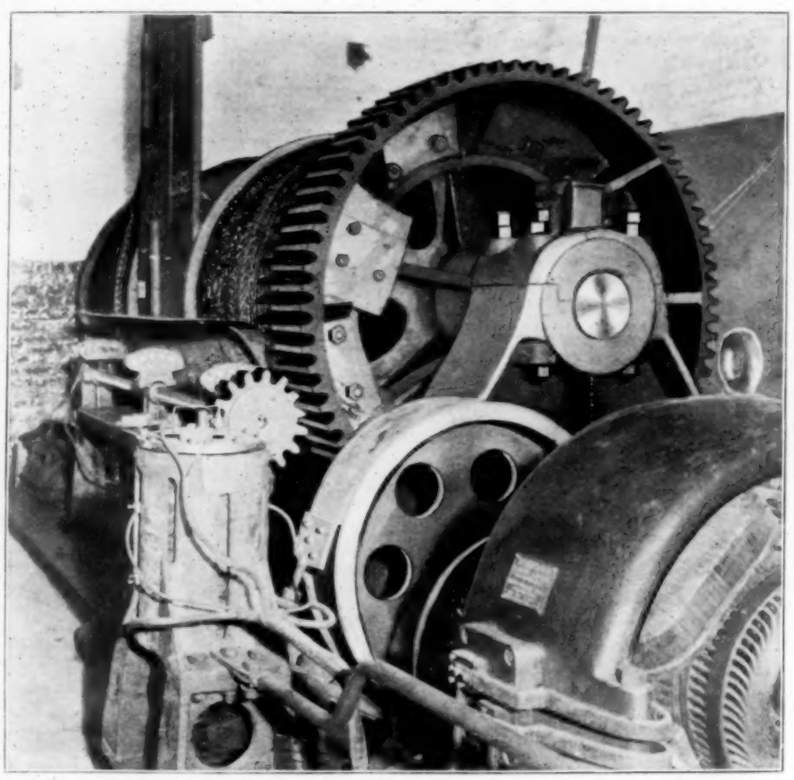


FIG. 2.—METHOD OF VARYING THE ELECTRO-MOTIVE FORCE OF THE ARMATURE.

The whole operation being absolutely automatic, even for the maximum variation of duties—minus 5,000 to plus 15,000—

given above, and for speeds of over 500 feet per minute, the operator's duty is limited to the motion of a switch when starting.

The second class of machine is operated by two compound motors. These are controlled in series-parallel combination by electrically operated switches, which in turn are controlled by a contact device geared to the main winding drums. The operation of stopping is exactly the opposite of that of starting, except that near the end a resistance normally in series with the shunt fields of the motors is short circuited, insuring a very slow speed just before setting the brake, and therefore a precise though easy stop.

A general view of the controlling device of the skip hoist at Furnace No. 1 of the South Works of the Illinois Steel Co., at Chicago, is shown in Fig. 1. The advantages claimed for this type of machine are reliability and positiveness of control. The machine is fully automatic in its action, it being necessary merely to close a baby knife switch to set it in motion, after which it will travel the proper distance and automatically stop.

If at any time part of the automatic apparatus should get out of order, it is possible to operate the machine manually, though of course care must be used when doing so. If one motor becomes incapacitated, the remaining motor will operate the machine without loss of time, though manual operation is advisable under these circumstances. While the motors are controlled by electrically operated switches, still the contact making apparatus which controls the solenoid switches is positively geared to the drums. The acceleration and retardation of the motors therefore is absolutely independent of the load. Fig. 2 shows the method of varying the electromotive force of the armatures. Fig. 3 illustrates another design for varying the electromotive force. Fig. 4 is a single motor hoist. This device is the design of E. B. Clark, mechanical engineer with the Illinois Steel Co.

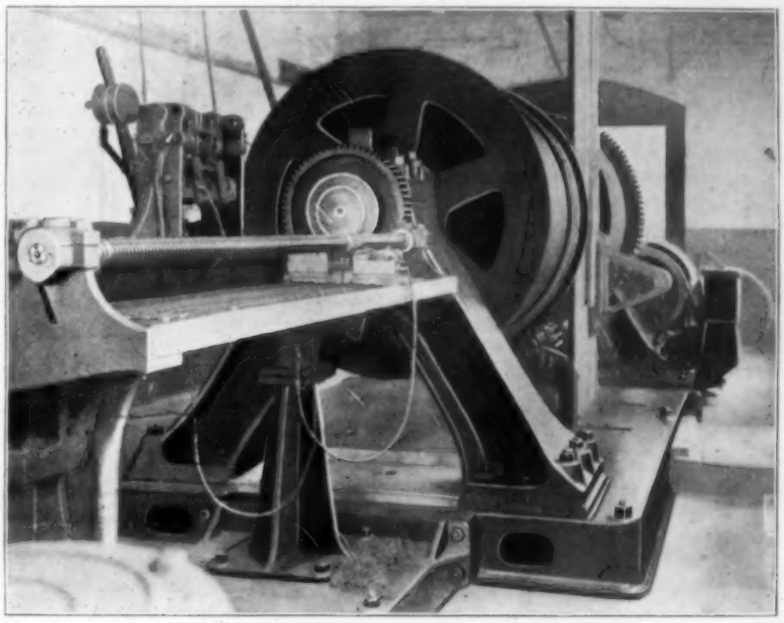


FIG. 3.—ANOTHER METHOD OF ARRANGING THE DEVICE.

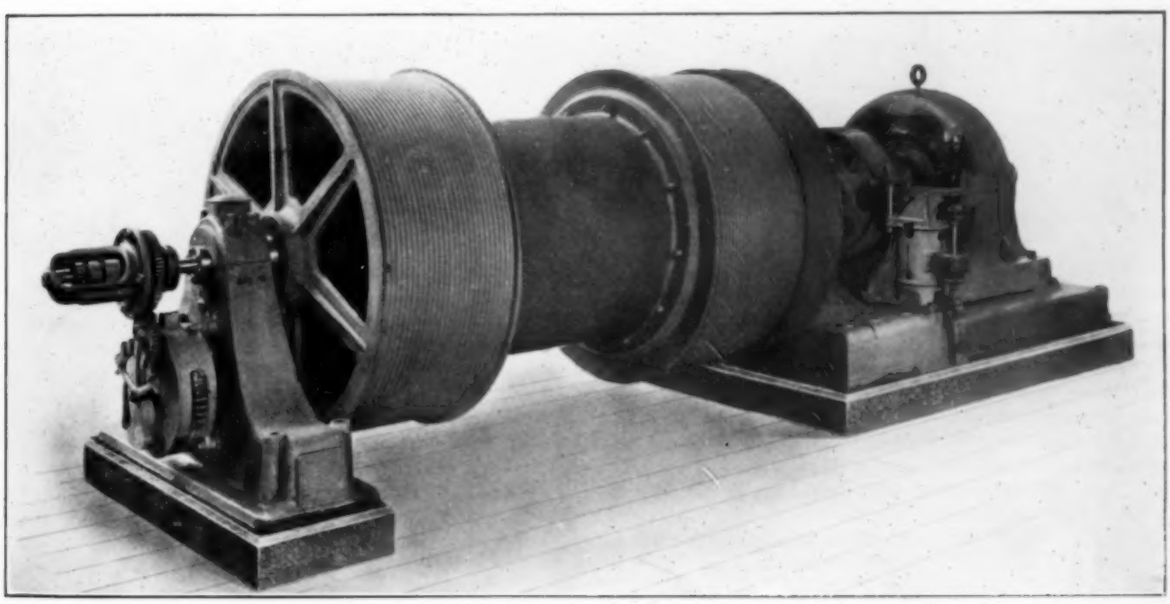


FIG. 4.—SINGLE MOTOR SKIP HOIST.

The contract for the 25,000 tons of rails, recently awarded by the Inter-Colonial Railroad of Canada, will be carried out by Kidston & Co., of Glasgow.

IRON AND STEEL WORKS DIRECTORY SUPPLEMENT

General Manager Swank, of the American Iron and Steel Association, announces the publication on April 15 of a Supplement to the Directory of the Iron and Steel Works of the United States which appeared early in 1902. The latter made a feature of full information concerning the iron and steel consolidations, and the new blast furnaces, rolling mills and steel works occupied considerably larger space than in any previous volume. Less attention was given, therefore, to complete lists of consumers of iron and steel than in some previous directories. The supplement now announced supplies these with more fullness than heretofore. It contains practically complete lists of the following: Iron and steel bridge-building works; iron and steel shipbuilding plants; locomotive works; all kinds of carbuilding works; car-wheel works; car and locomotive axle works and steel locomotive tire works; chain works; cast-iron pipe works; wrought iron and wrought steel pipe and tube works; riveted pipe works, and seamless drawn tube works; wire works; wire-nail works; cut-nail works and horse-nail works; works for the manufacture

of cold-rolled, cold-drawn, turned, polished, and ground shafting; stamping and metal ceiling works; malleable iron works; bolt, nut, and rivet works; and works for the production of heavy and light forgings, including drop forgings. Some of these lists cover lines not heretofore represented in any directory. There are also given complete details of a number of consolidations which are important consumers of iron and steel, such as the American Steel Foundries, American Locomotive Co., American Car & Foundry Co., American Shipbuilding Co., etc. The supplement will contain 196 pages bound uniformly with the Directory. The price is $5.

Earnings of the American Locomotive Co.

The great prosperity of the American Locomotive Co. is shown in a statement, just issued, showing that the earnings for the past nine months were nearly 50 percent of the outstanding capital stock of the company. The following is the statement given out by President S. R. Callaway:

"The earnings for the nine months ending March 31, 1903, (the month of March being partly estimated), were $23,956,345, an increase of $4,859,607 over the same period of last year. Since the organization of the company in June, 1901, more than $3,000,000 has been expended in the erection of new buildings and the purchase of new tools and equipment. The output shows an increase of 35 percent since the organization of the company, and the work of still further enlarging the capacity of the plants, by the purchase of property, new tools and equipment, is steadily maintained. Although badly handicapped by delays in receiving material, deliveries are being made substantially on time, and in many instances the dates promised for shipment have been anticipated. Within the last two months orders have been received for over 600 locomotives. All of the eight plants of the company, employing more than 16,000 men, are running night and day."

The directors declared the usual quarterly dividend of 1¾ percent on the preferred stock. Although there have been rumors that dividends would soon be paid on the common stock, it is understood that the policy of the company for some time to come will be to devote earnings to extensive improvements, and build up its working capital.

Charles Karstner, Chicago, has sold the machinery plant of Charles Kaestner & Co. to Charles Hecht for $270,000, subject to an incumbrance of $135,000, making the total consideration $405,000. The land consists of 25,000 square feet at Law Ave. and Jefferson St., Chicago.

KALTENBACH & GRIESS LOCOMOTIVE CRANES.

The locomotive cranes recently designed and now being built by Kaltenbach & Griess, of Cleveland, have a number of features of interest. The cranes are built for standard gauge, also for 14 and 18 feet gauge. Steel shapes are used in the construction to the exclusion of all other material wherever practicable, castings being eliminated to the greatest extent possible. Special attention has been paid to the design and workmanship of the steel construction. Holes in all connections are reamed, and the parts are turned out from standard gauges, insuring as far as practical the duplicating of all parts.

The standard gauge cranes, which are most commonly in use, being adapted for industrial plants, contractors' work, etc., are built in capacities ranging from the smallest to 60 tons. These machines are built with straight and curved booms, with fixed or variable radius, as the case requires. Digging buckets have also been applied to these cranes, so that they may be used in sand banks, dry marl beds and even in clay deposits; also for digging coal and ore. On the smaller types of cranes, standard Lidgerwood hoisting engines are used. Figs. 1 and 2 show the general arrangement of machinery as embodied in all these cranes, a principal aim of the design being to give the operator an unobstructed view of the load he is handling, placing the machinery to the rear rather than in front of him. In this particular these cranes differ from most standard locomotive cranes.

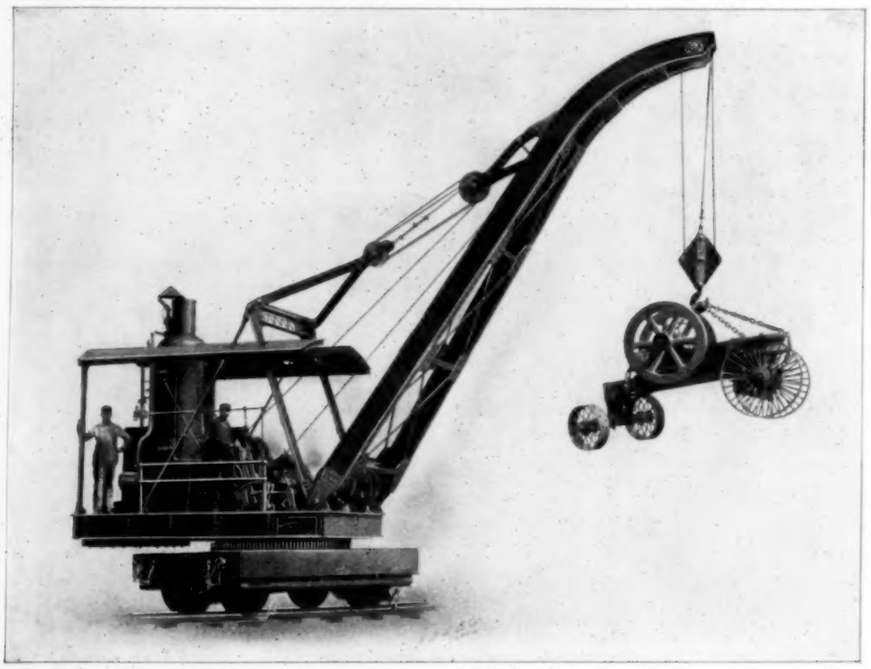


FIG. 1.—LOCOMOTIVE CRANE WITH CAPACITY OF 15 TONS AT 10-FOOT RADIUS.

The main hoisting drum frictions are of the Beekman patent type, requiring no adjustment, being of the double cone V-shaped design. The frictions used for revolving and propelling the cranes are of an improved design and suitable for a heavier service than has been commonly employed. These frictions are of a cup-shape design, constructed of either iron or steel castings, as the case requires, with a bronze cone. Special care has been taken to provide for such lubrication as is necessary to make an efficient and durable clutch. All the cranes, with the exception of some of the larger capacities, are fitted with right and left hand frictions of the above pattern. This enables the operator to propel the crane, or swing the boom in any direction, independent of any motion of the crane or engine. This addition to the propelling feature makes a quick operating crane and enables the operator to work with high efficiency.

Another feature is the fact that steel castings are used almost exclusively, especially on such parts are are not easily accessible. The wheels are chilled cast iron or steel tired

as the case requires, and are ground true to the same diameter, preventing differential action in propelling. The gearing is connected to both axles on all four-wheel cranes.

The friction clutches are designed for ample power with a large factor for surplus. However, they will transmit less power than is required to break any of the operating parts—a protection from damage when in the hands of a careless operator. Standard cranes are fitted with a canopy top, which forms a protection for the operator. All the levers are brought to a convenient point. The crane is designed with a view to heavy duty, is substantially constructed, and has an exceptionally large working factor throughout to meet the increased demands upon this class of machinery. Kaltenbach & Griess have designed and built a large line of traveling, cantilever and gantry cranes, and have recently brought out improvements in bridge and transfer cranes.

EMPLOYERS' ASSOCIATION OF COLUMBUS, IND.

President M. T. Reeves, of the recently organized Employers' Association, of Columbus, Ind., sends us the following concerning its objects and what it has accomplished:

"As introductory we might say that Columbus is a small city of about ten thousand inhabitants, with about one dozen manufacturers, which give employment to some 1,200 or 1,500 people. Something over two years ago the labor union organizer struck our heretofore quiet and smooth running little city, and in an incredibly short time, and before our citizens were aware of what he was doing, had us unionized from our smallest trades to our contractors and largest manufacturers. And now during the last few months they seem to feel they

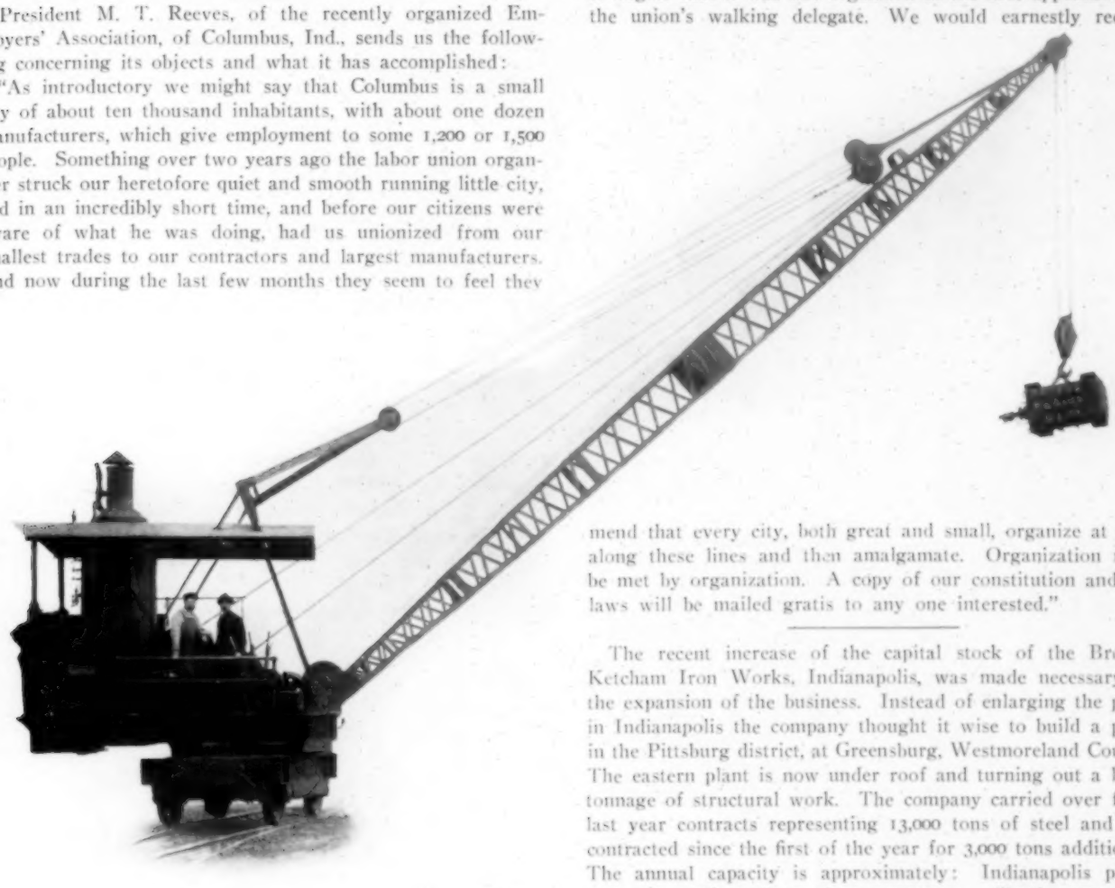


FIG. 2.—LOCOMOTIVE CRANE WITH VARIABLE BOOM. CAPACITY OF 4,000 POUNDS AT 50-FOOT RADIUS OR 12,000 AT 20-FOOT RADIUS.

are of sufficient strength to begin making their usual demands for recognition, shorter time, more pay, fewer apprentices, arbitration their way, etc. etc., as their demands usually run. And because these were not conceded in one of our largest factories, a strike was ordered. As soon as this was done our manufacturers, contractors, merchants and business men, realizing the danger our city was in of a general tie-up and a possible suspension of business, 'got together' and formed an employers' association, the objects of which are best stated in the constitution and read as follows:

"First. To protect its members in their right to manage their own businesses, in such lawful manner as they may deem proper.

"Second. The adoption of a uniform legitimate system whereby members may ascertain who is, and who is not, worthy of their employment.

"Third. The investigation and adjustment, by the proper officers and committees of the association, of any question arising between members and the employes, when such question shall be submitted to the association for adjustment.

"Fourth. To endeavor to make it possible for any person to obtain employment without being obliged to join a labor organization, and to encourage all such persons in their efforts to resist the compulsory methods of organized labor.

"Fifth. To protect its members in such manner as may be deemed expedient and proper against legislative, municipal and other political encroachments.

"Our association is only a few weeks old, and is not yet in full working order, yet we feel it has done much good in breaking down the force of the strike, and causing the more reasonable element of the union to stop and consider, also in moulding and directing public sentiment. While property has greatly depreciated in value, since our labor troubles began, and our contractors are practically out of business, yet we hope by the energetic work of our association, soon to restore normal conditions.

"We intend conducting a labor bureau in connection with our other work and have great hopes of its quieting influence. We are very enthusiastic over our association, and only have to regret that it was not organized at the first appearance of the union's walking delegate. We would earnestly recommend that every city, both great and small, organize at once along these lines and then amalgamate. Organization must be met by organization. A copy of our constitution and by-laws will be mailed gratis to any one interested."

The recent increase of the capital stock of the Brown-Ketcham Iron Works, Indianapolis, was made necessary by the expansion of the business. Instead of enlarging the plant in Indianapolis the company thought it wise to build a plant in the Pittsburg district, at Greensburg, Westmoreland County. The eastern plant is now under roof and turning out a large tonnage of structural work. The company carried over from last year contracts representing 13,000 tons of steel and has contracted since the first of the year for 3,000 tons additional. The annual capacity is approximately: Indianapolis plant, 35,000 tons; Greensburg plant, 35,000 tons. Total, 70,000 tons structural steel. The company now has work in: Boston, Atlanta, Washington, Annapolis, Md., Chicago, Cincinnati, New York, Utica, N. Y., Baltimore, Berkeley, Cal., St. Louis, Dayton, Cleveland, Newark, N. J., and New Orleans.

The appraisal of the M. Zier Boiler Co., New Albany, Ind., now in the hands of a receiver, shows assets of $29,716 and liabilities of $76,500. When contracts on hand are completed early in April the plant will be closed.

William H. Osborne, Milwaukee, has purchased the Lakeside Malleable Iron Works, and with his son will take charge of the plant at an early date. The works are located at Lakeside, a manufacturing suburb of Racine, Wis., and employ 175 men.

A director of the Lackawanna Steel Co. has been quoted as saying that the stockholders of the company took practically all of the issue of $15,000,000 first mortgage 5 percent, convertible twenty-year gold bonds, and the subscribers outside of the stockholders get less than $2,000,000 of the issue, although the advance applications for these bonds were in excess of $6,000,000.

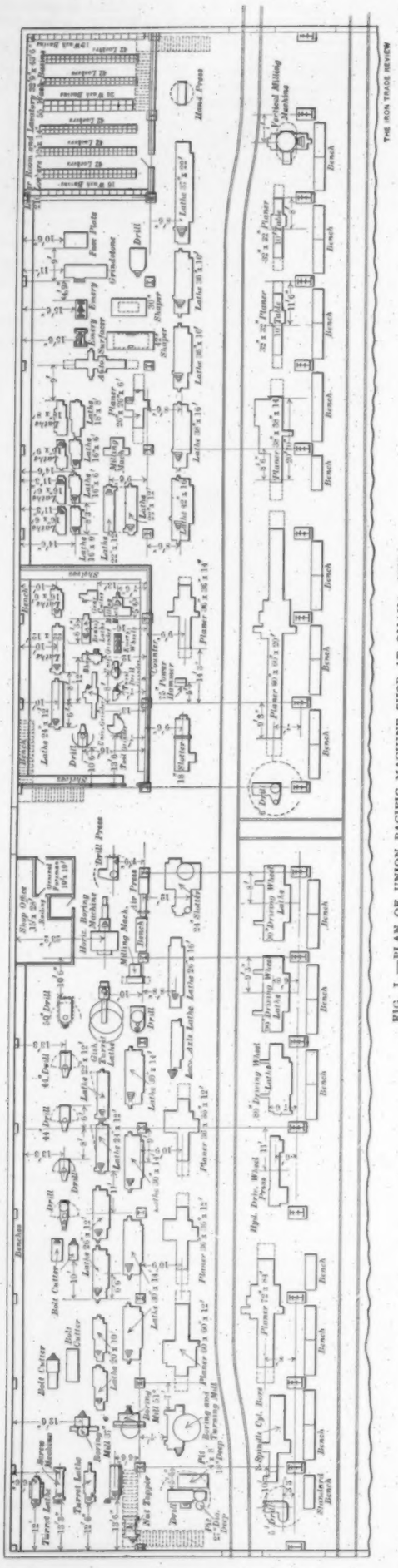


FIG. 1.—PLAN OF UNION PACIFIC MACHINE SHOP AT OMAHA, NEB.

Construction and Tool Arrangement in the New Union Pacific Shops.

The arrangement and the successful completion of the new shops of the Union Pacific Railroad at Omaha, Neb., reflect much credit on the chief engineer, J. B. Berry, and his associates who have had this extensive work in charge. We are indebted to the engineering department of the road for the following description of the main features of construction, with special reference to the machine and boiler shops.

The grounds are entirely enclosed by a board fence surrounding the following buildings: Power house, 80x150 feet; machine and erecting shop, 150x400; storehouse, 50x288; transfer platform, 45x300; oil house, 50x124; office, 75x85; boiler and tank shop, 150x244; blacksmith shop, 90x244; blacksmith iron storage, 40x130; blacksmith coal storage, 30x130; pattern shop and storeroom (two stories), 50x200; coach repair shop, 100x175; cabinet shop, 66x175; mill, 90x250; freight car repair shop, 175x175; coach paint shop, 150x175; wheel and truck shop, 100x175; cleaning and plating room, 45x75; upholstering room, 45x75; paint stock room, 25x45; transfer table, 80x350; wheel platform, 60x150; roundhouse, 80 feet containing 5 stalls; viaduct and incline, 800 feet long.

The first five of these buildings are already in use and the boiler shop is above the foundations and progressing rapidly. All the buildings, as will be seen by the illustrations, which are representative of the style of construction adopted by the engineers, are of brick and steel; the foundations for the columns are 18-inch concrete caps on piles put down to bed rock, which lies at an average depth of 20 feet. Concrete is the favorite material and is freely employed. Some of it is made in molds and handled like stone. The water supply is received through a 12-inch main and connected at both ends with the city water pipes and provided with suitable meters and bypasses. The water pressure is approximately 125 pounds. A fire department of its own employes is supported by the railroad company, which cooperates under the charge of the local authorities when the regular city force arrives.

Features of the Power Plant.

The power plant contains six Scotch boilers of marine type of 200 horsepower each, capable of carrying a working pressure of 160 pounds. These are equipped with Morrison furnaces of the suspended type and shaking grates of the Rose pattern. The waste gases are transmitted to a chimney, 9x200 feet, through a breeching of 3-16-inch steel. A main steam header, 12 inches diameter, takes the steam from the boilers and this is drained on the Holly loop system. The main header is divided by outside screw valves so that part of the plant can be shut down in the event of accident or when repairs are necessary. There is also an auxiliary header provided with two connections from the main header and this supplies steam to the pumps, injectors and one air compressor, and through a reducing valve is applied to the heating system. The engine equipment comprises two Westinghouse compound automatic engines, 18x30x16-inch cylinders, and one compound automatic engine, 12x20x12-inch cylinders, for light loads. These engines are direct connected to generators.

Generators are of the Westinghouse 250-volt direct current compound wound engine type. Two of these are 250 K. W. and the other 75 K. W. The current is taken through lead covered cables in conduits to a marble switch board. All the motors throughout the several shops are of the Westinghouse make and with the exception of those used on the cranes and elevators all are of the recent "S" type of semi-enclosed multipolar pattern. The line shafting and fans require twenty-one motors: One 30 horsepower, eleven 20 horsepower, seven 15 horsepower, one 10 horsepower, and one 5 horsepower. These are compound wound and run at 575, 600, 650, 750 and 950 r. p. m. respectively. The following 24 motors are for use on individual machine drives:

Number.	Horse-power.	Type.	R. P. M.	Tool.
2	3	Shunt	600	Niles radial drills
1	10	Shunt	650 to 900	Bement three-spindle cylinder borer
1	25	Compound	850	Pond 72x84 planer
1	10	Compound	750	Niles 300-ton wheel press

2	15	Shunt	600 to 850	Pond 90-in. wheel lathes
2	2	Shunt	1,200	Quartering attachments for wheel lathe
1	20	Compound	1,050	Pond 60-in. planer
2	5	Compound	1,500	Pond 32-in. planer
1	10	Shunt	650 to 900	Bement 32-in. vertical milling machine
1	15	Compound	650	Long & Alstatter 48-in. punch and shear
1	20	Special		
		Compound	775	Bement 14-ft. bending roll
1	15	Compound	800	Bement 14-ft. bending roll
1	7.5	Shunt	650 to 1,000	Niles 16 in. slotter
1	10	Compound	1,250	Pond 36-in. planer
1	15	Shunt	650	No. 9 Sturtevant blower
1	7½	Shunt	650 to 1,000	Bement drive wheel lathe
1	10	Compound	750	Niles sheet planer
1	10	Compound	750	Long & Alstatter punch and shear
1	5	Compound	250	Long & Alstatter flange punch
1	10	Compound	1,250	Niles 36-in. planer

There is a total of 620 horsepower in electric motors exclusive of the cranes. Motors with field regulation and drum

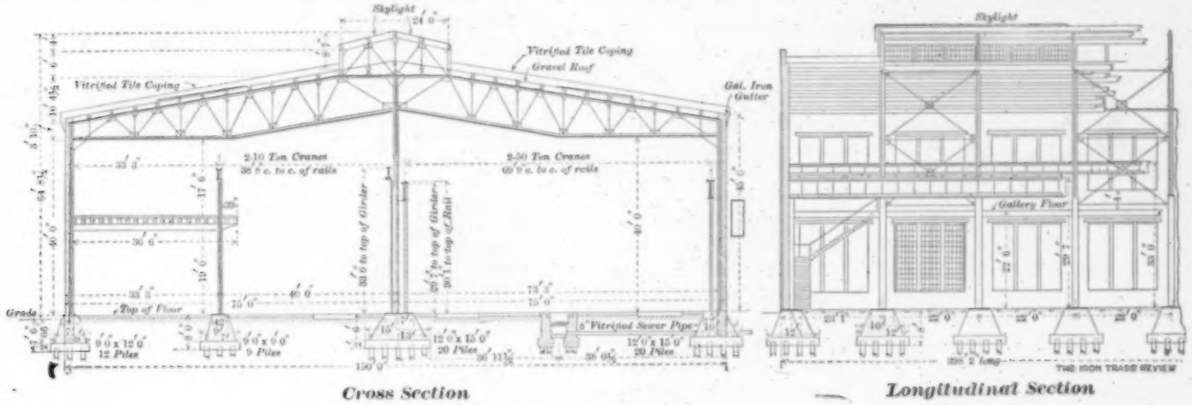


FIG. 2.—SECTIONAL VIEWS OF MACHINE SHOP.

controlled were selected where variable speed was required, and a number of the applications have been made by means of the Renold chain drive. Arc lamps are adopted for the general distribution of light, and incandescent lights for such local service as may be required, Farris' fixtures being used over the benches at the sides of the shop and between the

direct steam. The machine shop has two large fans, 15 feet high, which draw air through coils containing 10,000 feet of one inch pipe. These fans are driven by vertical engines at a speed of 200 r. p. m. and are rated with a capacity of changing 2,800,000 cubic feet of air every 20 minutes. The hot air from the fans and coils passes through galvanized iron ducts running through the center of the shop and over the erecting pits and also having opening reaching through the gallery. The fan in the boiler and tank shop is larger and is located upon an elevated support in order to economize valuable floor space.

Compressed air is freely employed in the shops for special tools, air lifts, etc., and the air piping is equipped with storage tanks in each shop and one in the power plant. The air plant consists of two Ingersoll-Sergeant duplex air compressors with cross compound steam cylinders with Meyer cut-off valve gear. Each compressor has a capacity of 1,000 cubic feet of free air per minute and weighs about 50,000 pounds. The low pressure steam cylinder has an automatic bypass so that if the compressor comes to a stop, on account

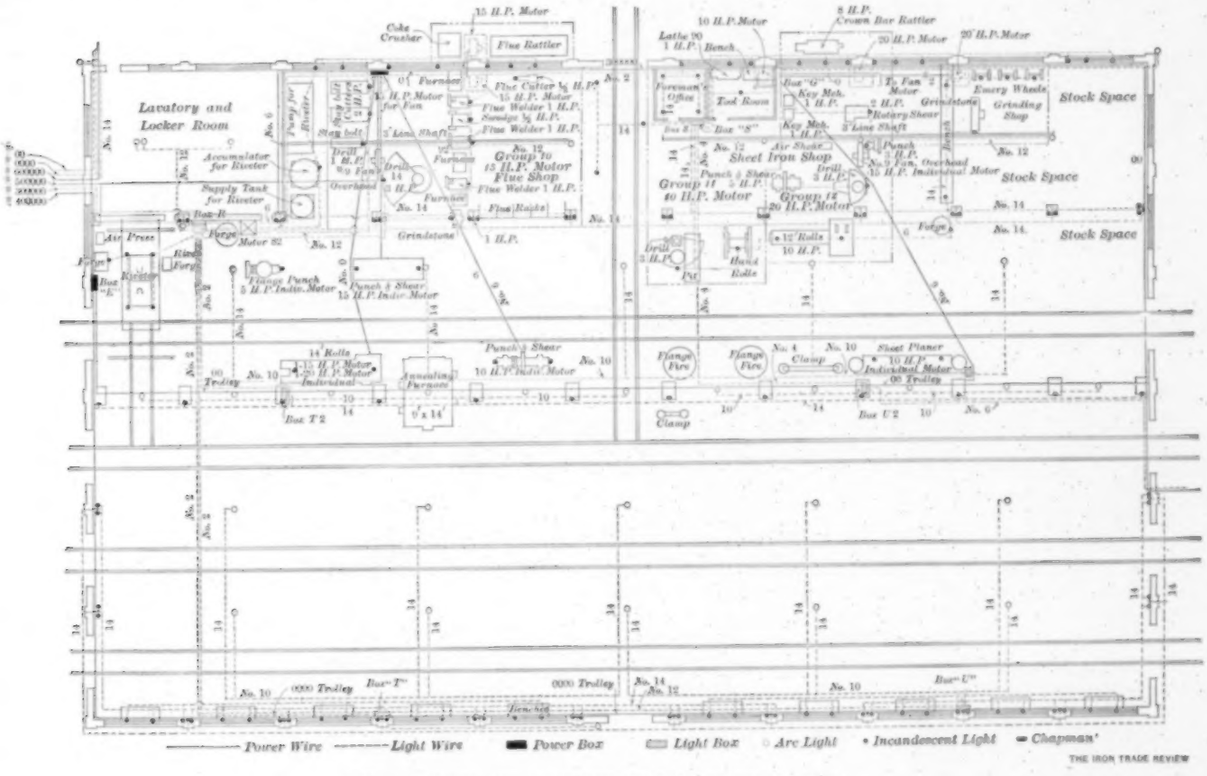


FIG. 3.—POWER AND TOOL DISTRIBUTION IN BOILER SHOP.

columns along the center. Chapman receptacles are provided at convenient locations on columns and walls on the erecting side. A telephone system has a station for each foreman at his desk and one in each department. The Sturtevant blower system is installed in the main machine shop, the boiler and tank shop, but the smaller buildings are heated by means of

of the decreased consumption of air, the machine will automatically start up even when the high pressure crank is on the dead center. The intercooler has a nest of one-inch tinned brass tubes with sufficient surface to cool the air to the original intake temperature before it passes to the high pressure air cylinder. Both the air cylinders are of piston inlet

type and the dimensions are as follows: High pressure steam cylinders, 16x18 inches; low pressure steam cylinder, 26x18 inches; high pressure air cylinder, 15¼x18 inches; low pressure air cylinder, 24¼x18 inches.

Machine and Erecting Shop.

The machine and erecting shop has the machinery arranged parallel with the tracks, three of these being on the erecting side of the shop and are therefore omitted in the illustration in order to gain space for the better exposition of the location and size of the machines. The tracks are 23 feet between centers and the middle track has two pits, each 150 feet long. There is a material track at a distance of 32 feet from the inner track for serving the heavy machinery tools in the space between the two tracks and at the center of the building a cross track connects the erecting shop tracks with the track running alongside the machines. The four tracks also run through the boiler shop. The building has a clear space under the trusses of 40 feet high and the floor space is unbroken with the exception of the center supporting columns and the supports of the gallery on the west side which also support the crane runways. A good proportion of the side and end walls of the machine and boiler shops is occupied with windows, the monitor roof being substantially all skylight and side windows. The roof is of felt tar and gravel with vitrified tile coping. The gallery of the machine shop runs the entire length, 400 feet, and is 19 feet in the clear below the floor girders. The width of the gallery is 36 feet 6 inches; 3 feet 3 inches of this space overhangs so as to form a convenient unloading platform for the cranes. The engineers in charge believed that this construction is an improvement upon the occasional projecting platform for this purpose as it enables the delivery of material to or from the cranes at any point. This feature of the construction may be profitably compared with the machine shop gallery illustrated in the article in *The Iron Trade Review* on the plant of the Vilter Mfg. Co. at Milwaukee. A space 32¾ feet by 43⅓ feet is partitioned under the north end of the gallery to serve as a lavatory and locker room. The space is subdivided forming an upper room with a width of 20 feet 7 inches which is reached from a landing on the gallery staircase. The lower room contains 55 wash basins and 210 Merritt expanded metal lockers. The top floor is made of concrete laid on expanded metal supported on 18-inch I-beams and the room is provided with 11 closets on the Nelson local ventilated latrine system and 10 urinals of the same type. A number of single urinals are also located at other points in the building. The locker room is reached from the outside by a door which faces an avenue leading past the office to the entrance to the yard and the workmen thus enter the shop and prepare for work with great convenience and least delay.

The entire length of the machine shop on both sides is equipped with benches and a row of them runs down the center beside the heavy machines. The benches are of uniform type with iron legs and shod with ¼-inch steel.

The illustration shows the arrangement of the tool room, which has two sides with shelves, a bench on the third side with a counter on the fourth. The tools are distributed by means of an annunciator having some forty push buttons located in different parts of the shop; a chart showing the location of the buttons and the delivery of the tools being made by messenger.

The cranes as well as the entire machine tool equipment were furnished by the Niles-Bement-Pond Co. The machine shop has two 50-ton with 69¾ foot span on the erecting side, 30 feet high, and two 10-ton cranes on the machine shop side with a span of 38¾-feet located at a height of 38 feet. The latter cranes serve both the lower floor and the gallery.

The grouping of the machine tools has been made with due reference to the speediest course of the work through the plant; but a careful study of the illustrations will show a grouping of the power supply which has also some noteworthy features. Each of these groups is driven by a 20-horsepower motor with the exception of two motors of 15 horsepower in the gallery and one of 15 horsepower in the tool room. The shafting is placed in line and equipped with flange couplings in order that connection may be made with another motor in the case of any electrical trouble elsewhere with a motor. The group motors are supported in two ways; those for the main floor are on platforms suspended from the gallery and those in the gallery are on wall brackets. Floor space is in no instance occupied partly or wholly by motor supports. The power house supplies the current on overhead feeders. The pipes from the same building to the machine shop for the erecting side between the tracks, for air, live steam or water, reach the shop through a concrete tunnel, then are carried overhead in the trusses and columns, drops being provided when necessary. The lighter work will be done in the gallery; coppersmiths, and pipe men have a portion of the space floored with brick on which stand forges. A similar provision is made on the main floor in front of the tool room for the tool dresser, where a forge and a light power hammer is located for such work.

THE ARMSTRONG UNIVERSAL RATCHET.

The universal ratchet made by the Armstrong Bros. Tool Co., of Chicago, is especially adapted to drilling holes in cramped

FIG. 1.—ARMSTRONG UNIVERSAL RATCHET.

places and will drive a drill in any position where it is possible to move the handle either in a vertical or horizontal direction or at any intermediate angle. The general view of the device appears in Fig. 1; and here may be mentioned the fact that two inches of motion at the end of handle will drive the drill.

There are no bevel gears and no ball joint. The bearings are cylindrical and the pawls do not slide lengthwise on the ratchet teeth. The universal quality of the tool is due to the fact that the axis of the two trunnions on which the handle turns is at an acute angle with the axis of the drill. The sectional view, Fig. 2, shows actual size of the No. 4 ratchet, the pawls, pins and spindle being exactly of the proportions

FIG. 2.—SECTIONAL VIEW OF UNIVERSAL RATCHET.

illustrated. The head of the ratchet is only 3 inches across so that it is possible to drill a hole 1½ inches from a side wall.

The set screw can be set up into one of the three countersinks and then the operator has a rigid handle as in the common ratchet. In two of these positions the handle stands at an angle out of the way of possible obstructions. There are twelve large teeth in the No. 6 ratchet and five pawls which engage one at a time. Thus the pawls catch sixty times in a revolution. Counting one stroke less of the handle for a rotation of the drill and comparing the ratchets in this way the present improvement cuts one-seventh faster than the common tool. These ratchets are made in various sizes and with suitable spindles for the different shanks of drills.

COST KEEPING IN FOUNDRIES.

BY R. W. MACDOWELL.

I regard it as necessary to have some system of cost keeping other than that which is shown by our books at

KEYSTONE FOUNDRY CO.

Daily Record of Shop Castings.

No.....Mr.....Date.....190..

Hours	No. Pieces	Kind of Article	No. Pounds
		Patterns	
		Flasks	
		Core Pans	
		Core Boxes	
		Ladles	
		Clamps	
		Weights	
		Plates	
		Rammers	
		Machine Repairs	
		Machine Gear Wheels	
		Machine Pulleys	
		Coke Oven Castings	
		Car Castings	
		Stove Castings	
		Engine Castings	
		Furnace Castings	
		Fire Fronts	
		General Job Castings	
		Special Job Castings	
		Sheave Wheels	
		Sash Weights	
		Pipes	
		Pipe Fittings	
		Brass Work	
		National Glass Co.	
		Columns	
		Spring Seats	
		Centre Door Plates	
		Journal Boxes	
		Ratchet Wheels	
		Ratchet Pawls	
		Brake Wheels	
		P. S. C. C.	

FORM 1.—MOLDERS' TIME CARD. ORIGINAL 4½ X 10½ INCHES.

For this purpose we need to have some system of keeping costs which will be accurate, and at the same time not be so elaborate as to require the time of several men to manipulate it.

It will not do to depend on the molders or the foreman to keep the time on different jobs, for in almost every case they will simply guess at it, and will thus leave you in worse shape than you were before, for you are probably

KEYSTONE FOUNDRY COMPANY.

TIMEKEEPER'S DAILY REPORT.

.....190.....

Foreman				
Labor in Foundry				
Labor in Core Room				
Labor on Cupola				
Moulders				
Helpers				
Outside				
Shaking Out				
Cleaning				
Chipping				
Emery Wheel				
Job Machine Work				
Machine Shop				
Shifting				
Carpenter Shop				
Patterns and Flasks				
Loading				
Other Labor				
Machine Foreman				

FORM 3.—TIMEKEEPER'S REPORT. ORIGINAL 5½ X 9½ INCHES.

better at guessing than they are. The writer tried this method when he first started in the foundry business, and speedily abandoned it. If you are to get any accurate data, it must be compiled by men in that line.

The method we use is to have a card made out each day by the factory clerk for each man, and these are turned in to the office early the next morning. As these cards

DAILY REPORT OF CASTINGS.

.....190.....

NAME	Mark	ARTICLE	Wt. Each	No. Cast	Disct.	No. Good	Wt. Cast	Wt. Disct.	Wt. Good

FORM 2.—PRODUCTION SHEET. ORIGINAL 8½ X 13 INCHES.

the end of six months or one year, or whatever period may be adopted for taking stock and closing the books.

have the different kinds of castings printed on them, it is not a great deal of trouble to do this. The timekeeper makes out his production sheet from these cards, and the report of castings is gotten from the cleaning room as soon as finished. As most of the molders work by the piece, this sheet is a necessity, and shows their time as well as the production.

DAILY FOUNDRY REPORT.

KEYSTONE FOUNDRY COMPANY.

.....190....

The Heat for To-day Consists of the following:

No..... lbs.....
No..... lbs.....
No..... lbs.....
No..... lbs.....
No..... lbs.....
Our Own Scrap..... lbs.....
Other Scrap..... lbs.....
Total.....
Jobbing Castings, lbs.....
Rejected Castings, lbs.....
Remelt..... lbs.....
Confused Scrap..... lbs.....
Gates..... lbs.....
..... pounds Castings.

No. pounds Coke.....
No. pounds Sea Coal.....
No. pounds Moulding Sand.....
No. pounds Core Sand.....
No. gallons Core Oil.....
No. pounds Chaplets.....
No. pounds Rosin.....
.....
Time required to melt heat..... hrs..... minutes.

.....FOREMAN.

FORM 4. DAILY FOUNDRY REPORT. ORIGINAL 5½ X 9 INCHES.

The timekeeper also makes out a report each day showing the exact cost of labor in each department. This is taken from the cards on which each employe of the works records his time morning and evening by means of a Rochester time recorder. The molders' time being piece-work is taken from the production sheet named above.

The factory clerk makes out a report each day showing the iron, coke, sand and other material used. Anything not provided for on this sheet is issued on requisitions, and is thus easily accessible.

When these data are collected each day, the writer figures up the entire cost of the day's running, using a card as shown in form 5. This provides for all items of expense, and can be filled out in a short time.

In the meanwhile one of the clerks figures up the value of the day's product from the production sheet, and it is entered on another card as shown in form 6. In this way, as we know the weight of our product, we can easily get the average cost per pound, by dividing this weight into the total cost. It costs us about 50 cents per day to keep these records, and it is amply worth it. We have detected a number of leaks by having it, and if there is any part of our business that is costing us too much, it shows up at once. Moreover, you do not always want to wait until stock taking time to know how you are running, and if you have your daily records before you, you can see how things are progressing with little trouble. Of course, you know whether you are making money or losing it (or if you do not, you will soon find out), but it is a good thing to know where you are making your money, or if you are losing, to get some idea of how to check the loss. You cannot do this if you have no reports except those you get from your books at the end of each year.

KEYSTONE FOUNDRY COMPANY

COST OF PRODUCTION..... NO.

NO. LBS. BRASS	
" " IRON # 1	
" " " # 2	
" " SCRAP	
" " "	
" " SHOP SCRAP	
" " OTHER "	
" " REMELT	
" " REJ. CAST	
TOTAL COST OF IRON	
MOULDING SAND LBS.	
CORE " "	
LIMESTONE "	
COKE "	
FACING "	
" "	
CORE OIL GAL.	
COAL " "	
MACH. " "	
FUEL	
LUMBER	
CORE ROOM	
CUPOLA	
MOULDERS	
HELPERS	
SHAKING OUT	
CLEANING	
OUTSIDE	
FOREMAN	
MACHINE SHOP	
PATTERNS & FLASKS	
FREIGHT	
AVERAGE DAILY OFFICE EXPENSE	
" " GENERAL "	
" " SALARIES	
" " INTEREST	
CASTINGS LBS.	

FORM 5. COST CARD. ORIGINAL 4 X 6 INCHES.

It requires some little time to get these reports going in proper shape at the start, but if you make it a law that no work shall be made, supplies issued, or orders taken, without written authority from the office, it does not take long to have everything working right.—[The Foundry.

Steel rails are being imported at Toledo from Germany. It is stated that 10,000 tons will shortly be received. The shipment will come via Quebec and the lakes. Of this order 2,500 tons will be used in Indiana and 7,500 tons in the building of a Northwestern Ohio electric line.

KEYSTONE FOUNDRY COMPANY

PRODUCTION..... 190

Class	Article	Weight	Price	Extension	Total
Class A.					
" B.					
" C.					
" D.					
" E.					
" F.					
" G.					
" H.					
" I.					
Brass					
Special					
Contract					
Amount					
Cost					

FORM 6. RECORD OF DAILY PRODUCT. ORIGINAL 4 X 6 INCHES.

Some New Things for the Shop, Chiefly by Way of the Patent Office.

A Spring Key or Cotter.

The spring key or cotter is familiar enough—a doubled length of half-round wire—but the Patent Office specification covering the improvement patented by T. S. Brown, of Poughkeepsie, N. Y., almost makes a stranger out of it. There the everyday cotter consists "of two semi-cylindric arms arranged with their flat sides facing each other, and their respective sides in parallelism,—connected at their rear ends by a loop or bight continuous of both." The general assumption is that a patent specification is addressed to men skilled in the art to which the subject pertains; they may not be lawyers, but the sentence cited does not seem to have been framed from that point of view. But this has nothing to do with the merits of the invention, which has been developed by a mechanic evidently who has had experience with the one undesirable feature of the common form of spring cotter. It is usual to drive a tool between the projecting ends and spread them so that the cotter is in to stay. This treatment occasions a sharp bend in the wire and is likely to cause trouble when an attempt is made to remove the cotter. The wire must be straightened

Fig. 1

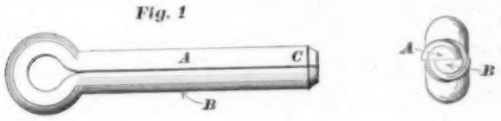
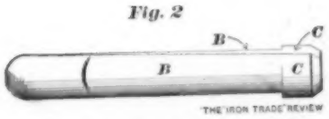


Fig. 2



A SPRING KEY OR COTTER.

sufficiently to allow it to pass through the hole and the wire may be broken in this operation so that the cotter cannot be again used.

Of the improved form, Fig. 1 shows a side and end elevation and Fig. 2 a plan view. The two arms are A and B and these are not arranged precisely opposite each other but are bent edgewise, slightly offset, so that the free end of each has an edge overhanging beyond the corresponding edge of the other. Commencing at the loop the arms are gradually reduced to a less radius than the other edge, so that at the end of each arm a projection C is formed which is shown in the end view of Fig. 1 and the plan Fig. 2. The cotter is intended, of course, to be used in openings of such diameter that the free ends will fit snugly within them when the arms are temporarily with the edges of the free ends registering closely with each other. This is the position when the new type of cotter is introduced into the opening, but as soon as the shoulders at C have passed the outer end of the hole the arms will spring edgewise into the position shown in Figs. 1 and 2 and the shoulders will overhang so that the cotter will be firmly retained in position.

This is all very well and the advantages of such a construction are easily understood, but trouble is likely to develop in making the new cotter. Not that this is impossible by any means, but it will give the die maker who arranges the press work and forming tools something to think about. The cotter business is essentially a quantity proposition and the solution of the manufacturing problem would be fully as interesting as the present patent and probably be nowhere as simple. The inventor describes a method of making the cotters which it is safe to say will be rarely used. "In making these articles by hand, both arms are conveniently originally of the same size and uniform diametric proportions from end to end, and the recesses or regions of reduced proportions or lesser radius are conveniently produced by filing away the outer edge portion or face of each arm."

Drill Chuck.

Henry F. Hagedorn, of Cleveland, has patented a drill chuck which is illustrated in Figs. 3, 4, 5 and 6. The first of these views is an elevation of the new chuck; Fig. 4 is a vertical section of the same; Fig. 5 is a cross-section through Fig. 4; Fig. 6 is a perspective view of one of the two locking jaws for the tool. The chuck is adapted more especially for socketing and gripping tools which have shanks intended for engagement by jaws which both center and drive the tool.

The chuck A has opposite slots with parallel sides and circular ends extending nearly the entire depth of the socket portion of the chuck, and upon the chuck thus formed is placed a collar C. This collar is subject to a stop, which limits the rotation of the sleeve to its use for locking and unlocking the tools. The collar C has internal cam surfaces which leave a portion of the sleeve at each end uncut so that the collar C will be held centrally upon the chuck. The cam surfaces have a long taper which runs out into the plain intervening surface of the sleeve or collar C. The jaws for centering and locking the tool shank B are indicated at D and the gripping portion is shaped to conform to the tool shank. Many twist drills and similar tools have straight instead of tapered shanks and some of these have V-shaped grooves to which the jaws correspond.

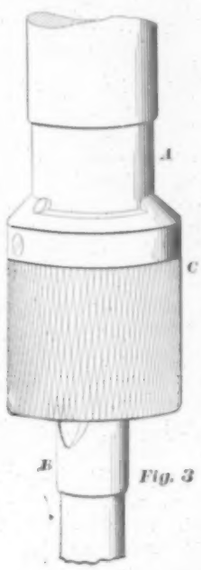


Fig. 3

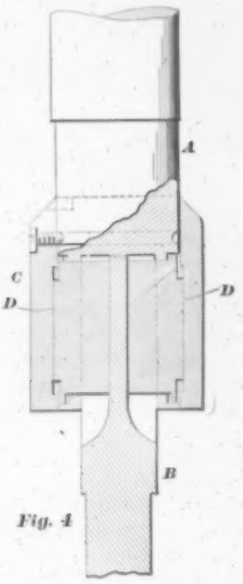


Fig. 4

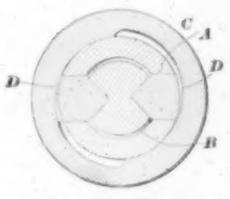


Fig. 5

Fig. 6

SIMPLE DRILL CHUCK.

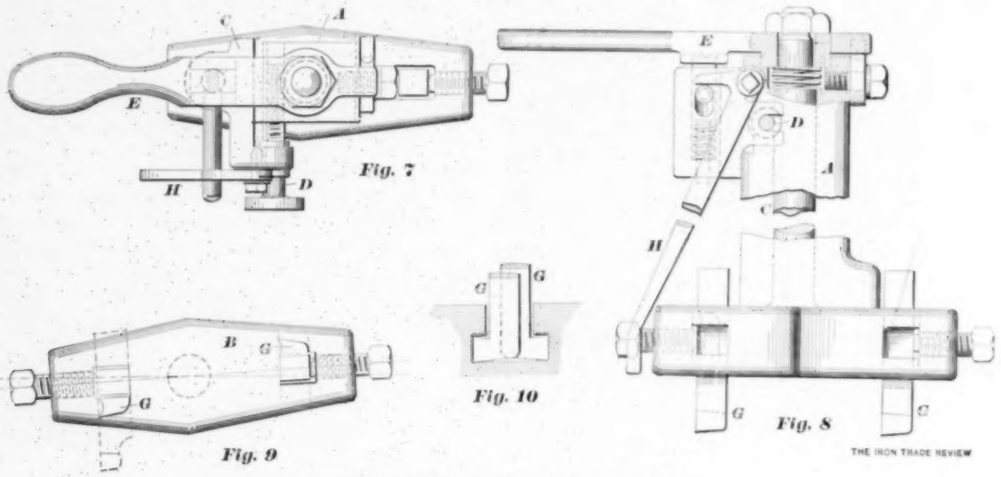
The back of the jaws has lips resting in recesses in the chuck so that they will not drop inward when the tool is withdrawn. The slight movement of the jaws required for releasing or engaging the shank will call for but a shallow taper of the eccentric and the chuck will thus accommodate shanks which vary considerably in size, a matter of some importance because of the differences found in the standard sizes of different manufacturers.

An Adjustable Tool-Holder for Planers, Etc.

The inventor, George H. Kleinert, of Cleveland, calls this a tool-holder and manipulator and, as will be seen, it is along the line of improvement in the making of T-slots and similar work. Fig. 7 is a plan view, Fig. 8 is a sectional elevation, Fig. 9 is

a view of the underside of the tool-holder and Fig. 10 illustrates a section of a T-slot and the position of the cutting tools.

The device consists of the block A, the tool-holder B, the slide C, a threaded spindle D and a hand lever E. The head of the tool-holder B is perforated for reception of the cutters G which may be placed vertically or horizontally as the cutting conditions require. The spindle or shank of the tool-holder is retained in the block by means of the nut shown on top of the lever E. The slide C is near the top and front of the hub A having a means of adjustment in the spindle D. There is a pin in the front of the slide C which is supported by a spring engaging the lever E. A side arm fastened to the pin projects in the path of a trigger H and when the last depresses the



AN ADJUSTABLE TOOL HOLDER FOR PLANERS, ETC.

pin the lever E is released. A short arm extends from the rear of the lever E and an adjustable stop is attached to the back of the hub A within reach of the arm. The turning of the lever is thus confined within the necessary limits, such as are sufficient to release the tools during their return movement. The lever E is intended to be swung in one direction only. The pivotal feature of the tool-holder and the ability to carry two or more cutters in simultaneous operation make the device especially useful in undercutting or T-slotting where the two cutters can work on opposite sides of the first groove cut—the entrance slot, as the inventor terms it. The pivotal mounting of the holder enables it to be readily moved so as to permit the withdrawal of the tools in the return movement of the planer table or a cutting of a deeper undercut at the forward motion. The cutters can be placed at an equal distance from the axis so that the turning of the tool head will effect an equal feed to both the cutting tools.

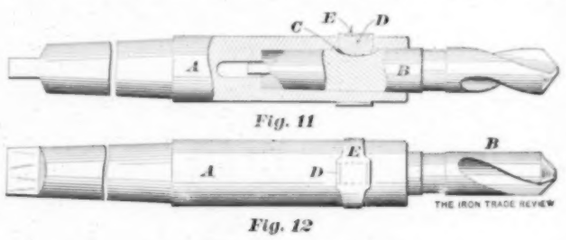
The spindle D permits the workman to feed the cutters in undercutting when forming a T-slot and before each return stroke a quick release is effected by depressing the arm which is done automatically by the trigger H which has its long arm come in contact with some stationary obstruction. At the end of the return stroke the lever is forced by hand to the locked position.

Theoretically the device seems to fill the requirements and if carefully made and maintained will probably work satisfactorily but the number of parts and their arrangement would seem not conducive to the rigid condition essential to thorough success. Any looseness of the parts would tear up or bind in most unpleasant fashion. This may be avoided doubtless by careful handling but the question arises, will the device get that constant care?

Connecting Tools to Sockets.

The two illustrations, Figs. 11 and 12, show a patent recently obtained by Arthur F. Pitkin, of Schenectady, N. Y. Fig. 11 is an elevation and section of a twist drill and socket and Fig. 12 is an elevation taken in a plane at right angles to that of Fig. 11. The inventor points out that a defect of tool sockets of the average construction is in the fact that they permit the tool under severe strain to turn in the socket, loosening the taper fit and thus transferring the strain from the taper to the tang. The tang is often twisted off and the tool so impaired is next to useless. Another defect is manifest when the tool is run through a hole slightly smaller than the drill, in which case the drill almost invariably is drawn down into the hole, dragged out of the socket, injuring the tang and scoring the inside of the socket.

The present invention is shown as applied to a socket A and a twist drill B, these being of well known types. A short keyway C is cut in the drill shank so as to stand when the drill is in a working position in the socket at such a distance from the outer end of the latter as to allow sufficient metal to be left in the enclosing shell, between the end and the slot for the connecting key D, to insure ample strength. The key D and the slot in the socket are of rectangular section and the inner face of the key abutting on the keyway is convex and curved on a shorter radius than the bottom of the keyway. A recess on the outer face of the key D receives a retaining spring E. This retaining spring E is a thin plate of elastic metal bent into ring form and surrounding the socket and the key when the latter is inserted in its slot in the socket and in the keyway C of the drill. The spring fits neatly in the



CONNECTING TOOLS TO SOCKETS.

groove of the key, the sides of the groove preventing it from sliding off the key and it is prevented from turning on the socket by lateral tongues which abut on the ends of the walls of the groove.

The operation of the key and spring is entirely automatic. The tool enters the socket pushing back the key and spring until the shank reaches its seat and the spring forces the key into the slot. A drift pin will extract the tool, the spring and key acting in the manner already described.

A Variable Speed Transmission Mechanism.

The last few years has seen a great amount of activity in the line of speed changing devices. The growth of the automobile industry and the lack of flexibility in the gasoline engine has had much to do with this interest but the work has been by no means confined in this direction. The need of a more gradual transmission than that afforded by cone pulleys and the step by step awkwardness in both design and subsequent manipulation for machine tools generally has encouraged mechanics to bend their energies toward other methods.

The illustration, Fig. 13, shows one of the latest of these efforts as intended for a countershaft. This is the invention of Fred J. Nutting, of Dayton, O. One feature of the invention

which indeed is one of the main advantages claimed by the designer is in the ability to increase the number of the transmission rollers and as the drawing selected for illustration is a sectional elevation but two of these rollers are shown.

The hangers A support three bearings of the shaft C nd on the shaft is a pulley B which slides on a spline and is forced to the right by the spring E. The belt pulley D runs loose on the shaft and is kept in place by a collar. There is a bevel gear F on the side of the loose pulley D and this meshes with two or more bevel gears G which are on shafts parallel with the face of the cone pulley B. There are friction rollers sliding in carriages H on these shafts, the friction rollers being splined to the shafts and the carriages are movable along guide rods as shown. The guide rods have their ends mounted on the bearings of the shaft C. The screw J moves the shifting collar

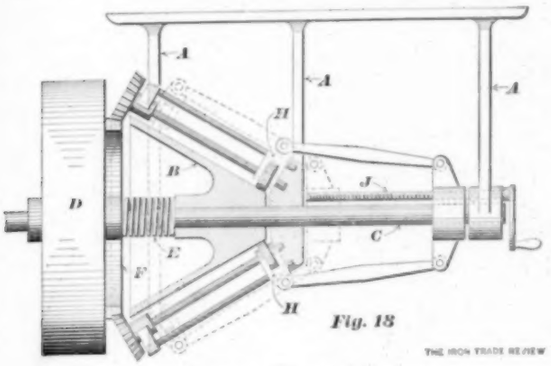


Fig. 13

THE IRON TRADE REVIEW

A VARIABLE TRANSMISSION DEVICE.

along the shaft C and locks the friction rollers at any desired position and the speed of the shaft to be driven from the pulley D will be greater or less as the rollers are brought nearer to or farther from the larger diameter of the cone pulley B.

A hasty glance at the device may suggest that the arrangement for changing the speed is inconveniently arranged as the crank for operating the adjusting screw J will on a countershaft be found near the ceiling. A sprocket and chain or any similar device could easily be substituted for the one illustrated in Fig. 13.

Manufacture of Steel Dies.

Charles Ball and H. E. Nock, of Providence, R. I., have devised a method which is intended to cut the item of expense in making steel dies as well as increase the durability of the product. The current methods involve the cutting of a design in the steel block or forcing a patrix into heated steel. Iron

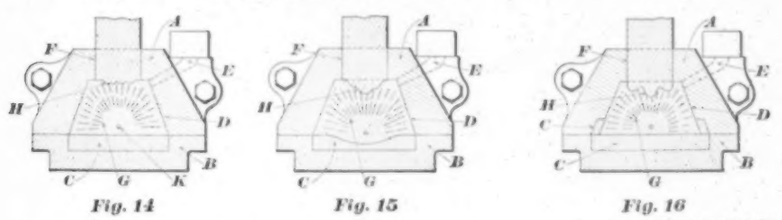


Fig. 14 *Fig. 15* *Fig. 16*

THE IRON TRADE REVIEW

THE MANUFACTURE OF STEEL DIES.

dies may be cast in sand for use on soft metals and coarse designs but steel does not in practice admit of this treatment. Attempts have been made to subject a block of heated steel to the stroke of a cast iron patrix; but this requires too great an expenditure of expert labor to be commercially available. The use of bronze patrices upon a block of heated steel has been attempted, but results in welding the surfaces of the patrix and die or when the steel is not at a high temperature defaces the patrix. Especially is this true in the case of dies, where the repetition of forcer strokes gradually obliterates the outline of the figure on the pattern die.

The inventors point out that in changing from a molten to a solid state steel undergoes marked contraction, in which case the metal is radially drawn from the last place of solidification. When casting steel dies in open molds of high thermal conductivity (such as iron) the exterior of the casting contacting with the relatively cold mold is the first part to solidify and the upper surface the last, thus locating the center of shrinkage at the working face of the completed die. Attempts have been made to overcome this difficulty by mechanically displacing the cavity by forcing a steel block into the cooling mass; but the inventors propose to control the location of the inevitable cavity by subjecting the molten steel to surroundings of varied degrees of conductivity.

Fig. 14 is a transverse section of a mold and patrix, the latter having a flat working face; Fig. 15 is a similar view of a modified form of mold and patrix face and Fig. 16 is a like view of another modified form of mold and patrix.

The same letters are employed in each view to indicate like parts. A represents the tapering walls of a mold and B is the base; the whole composed of iron, or steel of high thermal conductivity. A layer C is let into the base, this layer being of non-conductible material such as steel-crucible clay. There is a pouring gate E leading to the upper portion of the central chamber D and a large opening F in the top of the mold permits the entrance of the patrix having on its lower surface the working face H. The patrix is intended to be of bronze composition of pronounced bulk and area to speedily reduce the temperature of the mass of steel near the working face H to a degree less than the melting point of the patrix. The modified form of mold and patrix working face shown in Fig. 15 is employed when the depth of the patrix contour threatens a too sudden chilling of the lower center of the molten mass of steel from which the metal involved in shrinkage must be drawn. The same end is attained in molds of greater depth, as are sometimes required by the modified form of mold shown in Fig. 16, where in order to prevent an undue increase of conductive area the non-conductible layer C is extended from the mold base some distance in the walls A of the mold.

The process is as follows: The face H of the patrix is polished with dry plumbago. The mold is then raised to a temperature approximating 300 or 400 degrees F. The steel to be transformed into a die G is after melting poured through the gate E into and filling the chamber D. The exposed mouth of the pouring gate is covered with a block of cold iron which immediately chills the contents of the gate. The patrix is then forced through the opening F until the face H enters the molten steel G. After resting in the mold a sufficient time to solidify the mass of steel is removed from the chamber D and annealed, hardened and tempered. The process is claimed to give the cast die a strength which compensates for the absence of a fibrous formation, the peculiar feature of forged steel, and directs the strain involved in the use of the die along these lines of contraction (shown by the lines of crystallization converging from the surface of the die G toward the point K) to the base where the increased mass is better adapted to receive it. The action may be considered as follows: The broad surface of the bronze patrix face being the best thermal conductor insures a cooling of the upper surface of the mass G first. The conductivity of the surrounding walls A of the steel or cast iron being less than that of the bronze patrix cooling is delayed somewhat, while the clay strip C in the mold bottom, being an excessively poor thermal conductor, insures the last place of cooling of the die G to be at a point K near the clay bottom and equidistant from the sides of the die.

A New Type of Hammer.

The familiar claw hammer of packing case usefulness had but one conspicuous failing, and the workman had about reconciled himself to it. That was the inability of the hammer to draw out nails which were beyond a very limited length. Of course the nail could be drawn out a short distance and then a chisel or anything similar would be set near and the additional height enabled the workman to get another pry. This is but an obvious make-shift. Figs. 17 and 18 show the latest claw hammer improvement, Fig. 18 is an end view of Fig. 17. The hammer has an outer claw A for use on short nails and having a continuously curved convex face to form a fulcrum for an inner claw B which is designed for the

extraction of larger and longer nails. The inner claw extends beyond the end of the outer claw so that a bite on the long nail can be obtained without first starting it with the outer claw. It will be seen that the opening between the two claws is cut away to afford room for the head of a nail.

The inventor, George F. Voight, of San Francisco, is naturally enthusiastic in his description and says that the new

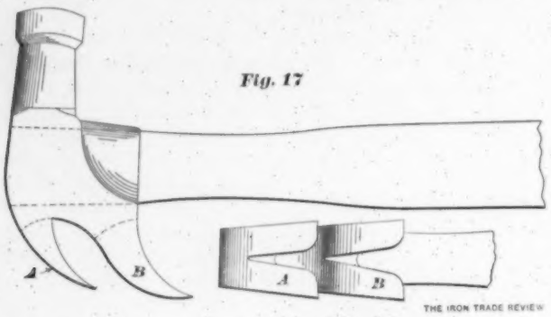


Fig. 17

Fig. 18

A NEW CLAW HAMMER.

hammer is a "comparatively inexpensive tool of great strength and durability." It is not clear just how the proposed construction can be any cheaper, stronger or last longer than the other pattern could be made.

THE HANGING ROCK IRON REGION.

IRONTON, O., March 31.—As a counter proposition to the demand of the blast furnace workers of this district, for an increase of 15 percent, the furnace operators expressed a willingness to concede an advance of 25 cents a day for turn work. This has been accepted by the men and the strike threatened on April 1 has been averted.

S. B. Steece, B. H. Burr, John Peebles, Thomas Parker and associates, all stockholders of the Belfont Iron Works Co., will likely close an option on the property of the Lawrence Furnace Co., at Culbertson, Lawrence county. The option covers the blast furnace, 350 acres of land and 55 houses. The price is $100,000, and, if purchased, the capacity of the furnace will be increased from 45 to 100 tons daily.

The Marting Iron & Steel Co. contemplates the erection of a plant for pulverizing furnace slag, which is largely in demand for ballast and street foundations.

The strike at the sheet mill plant of the Ashland Steel Co., Ashland, Ky., remains unchanged. The plant is being operated with non-union men, who are being housed on the company's premises to prevent a repetition of several outbreaks during the past few weeks.

The Ironton Machine Shop, Glendenning, Barker & Co., will begin the operation of a small repair and construction plant in Ironton early in April, the buildings being almost completed.

Ground has been broken for the large plant of the Ironton Engine Co., at Ironton. The buildings will be entirely of cement, iron and glass. The company will manufacture engines up to 500 horsepower capacity and do heavy repairing. The plant will be ready by fall and 150 skilled men will be employed.

The furnace operators of this district, who recently took preliminary steps for organizing to lease or purchase Lake Superior ore lands, in case the price of ore was not reduced, have not yet taken definite action, but another meeting will be held when the ore producers are heard from.

The wire nail departments of the Kelly Nail & Iron Co. and the Belfont Iron Works Co. are in operation, but work in the cut nail departments of both mills has been suspended for some days.

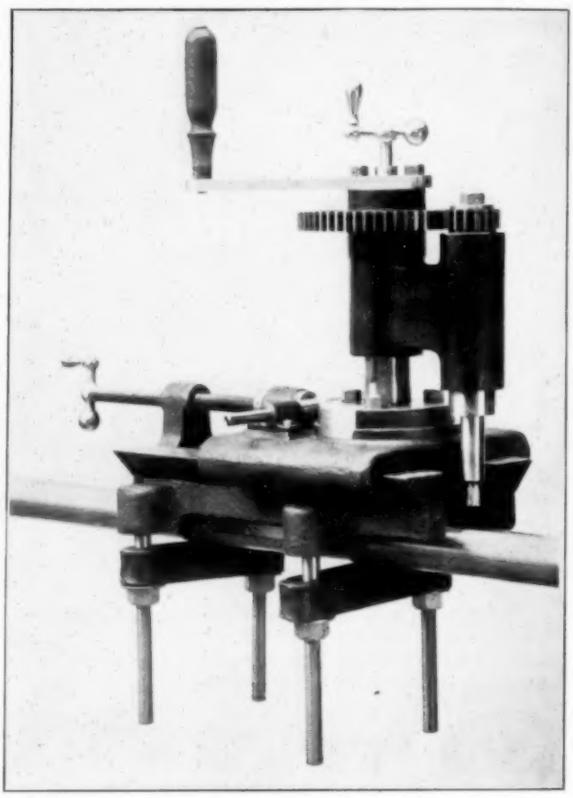
The Marting Iron & Steel Co. is putting in eight large new boilers, furnished by the Olive Foundry & Machine Co., of Ironton. They will be used as a reserve battery.

Last week an additional force of fifty men was put to work at the Burgess plant of the Portsmouth Steel Co. The plant is working double turn in all departments. The large electric charger for the four furnaces will be finished this week.

NEW PORTABLE KEYSEATER.

A new portable keyseater has been brought out by John T. Burr & Son, 38 South Sixth St., Brooklyn, especially for routing the ends of milled keyseats and for truing up the sides of keyseats worn through loose gears, pulleys and couplings. The machine has a capacity for shafts up to 6 inches in diameter and will mill close up to a shoulder or flange. The bed of the machine, which is clamped on the shaft, is made of V form, so that when the machine is fastened by the binders, it will be parallel with the shaft and the keyseats cut will be true with the radial line. The cutter spindle is carried by a turntable on the slide, the setover for truing up worn keyseats being obtained by means of a worm and wheel adjustment. The part carrying the spindle is provided with a down feed screw so that the spindle can be lowered to the proper position and locked. The machine is fed by hand, the slide having a parallel travel on the base of 8 inches, without resetting.

In routing the ends of milled keyseats the turntable is set to the zero line on the slide, the cutter fed down until it



A NEW PORTABLE KEYSEATING MACHINE.

touches the bottom of the keyseat and the slide is fed up, with the cutter rotating, until the keyseat is rounded out. In truing up worn keyseats it is advisable to use the setover to the cutter-spindle, truing up first one side of the keyseat and then the other. This machine is also adapted to truing up worn keyseats on the axles of electric cars, these keyways often becoming distorted through gears working loose.

A new type of file, specially devised for working upon gun metal, has been introduced into the engineering department of the Chemin de Fer du Nord, France. The feature of this tool which distinguishes it from the general type of file, is a series of shallow channels which cross its face diagonally at an angle of 30 degrees and placed about half an inch apart. The raised portions of the surface of the file between these channels are occupied by the teeth of the tool. The advantages of the file are that it clogs less rapidly, and can easily and quickly be resharpened on the sand-blast, while it increases the work of the engineer who uses it in connection with gun metal filing, by 30 percent.—[Scientific American.

First Aid to the Injured in Metal-Working Industries.

Shop pressure, whether in the machine shop, the foundry, steel plant or elsewhere, has not lessened the effort to surround the workman with various safeguards against accident. Gears are bonneted with a partial covering or enclosed in the frame of the machine; saws have overhanging guards; cutters are placed behind mica or glass plates; the use of goggles for the eyes when chipping any metal or when machining metals (steel or brass for example) that are liable to damage the sight by flying particles—these and other safeguards and aids are much more common than of old. The ounce of prevention is worth more than the pound of cure anywhere; and the present interest in shop betterment is based upon this rule. The prevention of delays acts like a quickening of the gait and there is nothing like a shop accident to disturb the regularity of production. The misfortune of accidents, ranging from serious to trivial, may be largely reduced by different means, such as these already mentioned, but the most careful supervision on the part of those in authority or the watchfulness of the workman himself cannot make a shop immune from injury. Human nature is not capable of such accurate action, either individually or collectively; and bruises from falling weights, burns from the splashing iron in the foundry or the coiling wire at the rod mill, with many other causes of painful injuries, will continue to break in upon the daily toil.

Most shops are in or near cities or large towns where the services of a surgeon are obtained with but little delay, and many of these plants have no special provision for supplying anything in the way of first aid to the injured. It is believed, and the argument has weight, that an expert can be called so quickly that it would be injudicious to make any amateur experiments. There is, however, a wide range of opinion on this very point, a number of employers believing that the prompt anticipation of the work which will be carried on by the surgeon later would not only be of great assistance but in some cases actually save a life.

The Allis-Chalmers Co.'s Plant.

The illustrations show one of the most ambitious and successful attempts at supplying first aid to the injured. It is from the mammoth shops of the Allis-Chalmers Co. at Milwaukee. The project has evolved naturally from the Allis Mutual Aid Society connected with these works. This organization is supported by dues of 50 cents per month from the members, 50 cents initiation fee, and a contribution from the firm equivalent to the total dues. The society pays sick and death benefits. The purchase of an ambulance by the company suggested the organization of an ambulance corps by the physician of the society, Dr. Thomas Lucast. The doctor is hopeful that something similar may be done in most large factories. "I feel," he writes, "as if it is a great need, for though in case of accident the men want to help it is distressing to see how much harm often results from injudicious care and ignorance. I have often seen men almost bleed to death from trivial injuries and more than one life sacrificed when a little knowledge might have saved."

Dr. Lucast has a corps of 31 men, an average of two from each department, and these are given lectures every two weeks on the treatment and care of the injured. The lectures follow the line of work of the St. John's Ambulance (of Great Britain) and the drill of the United States Army Hospital Corps. The dust proof boxes containing supplies are shown in one of the illustrations, and each of the fifteen boxes distributed through the plant contain bandages, antiseptic gauze, absorbent cotton, carbolic acid, scissors, spoons, splints, aromatic spirits of ammonia, cups, safety pins, together with a supply of towels, a scrubbing brush, soap and wash bowl. The doctor believes that the men should be drilled in the use of but a few remedies rather than risk the confusion of many, and is very enthusiastic over the results obtained. The Allis-Chalmers Co. has equipped the hospital and operating room with the necessary supplies and instruments, and the installation, as may be seen by an examination of the halftones, is a very complete one.

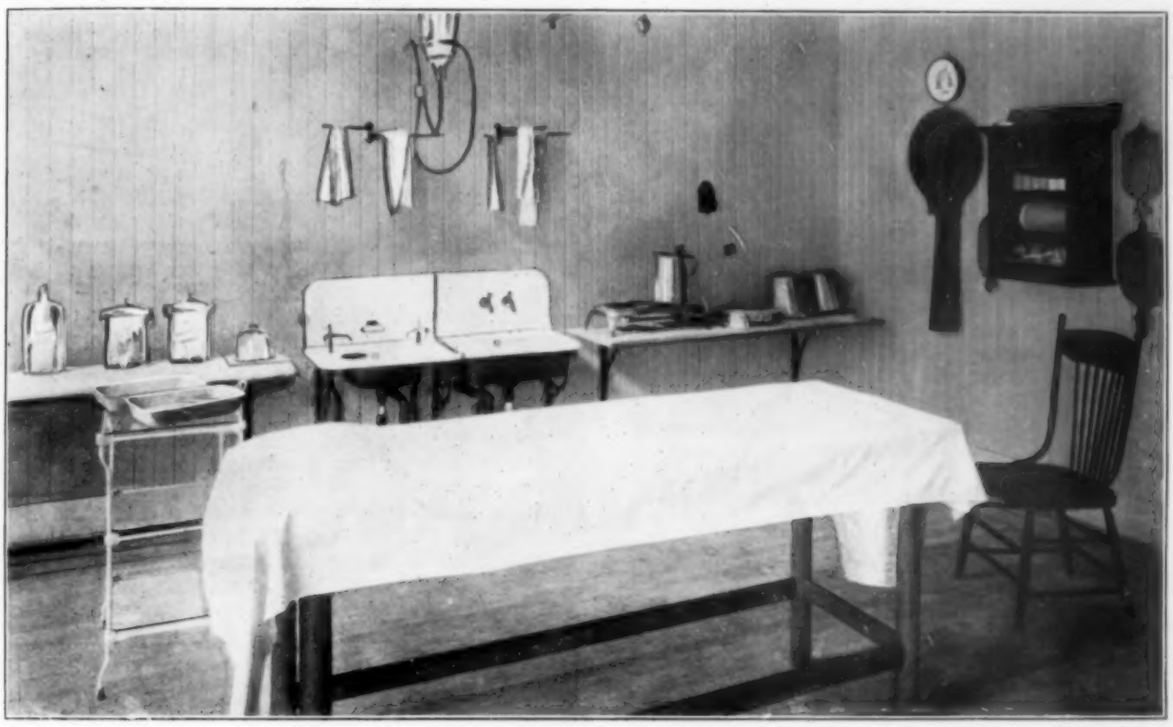


FIG. 1.—OPERATING ROOM AT ALLIS-CHALMERS PLANT.

National Steel Co.'s Ohio Works.

Passing from a representative machine shop of large dimensions and many employes we may take up the steel plants. At a number of these the first aid corps does police duty about the mills and furnaces; the men are given instruction in the treatment of the injured preceding the arrival of a surgeon, and hospital departments are installed where minor injuries may be dressed and serious cases prepared for the journey to the local hospital. The National Steel Co. at Youngstown, O., may be taken as a representative plant in this class and the writer is indebted to the general superintendent, Thomas McDonald, for considerable information about the work. It

may here be pointed out that one of the objects in the present investigation of the subject of first aid to the injured was to ascertain the best form of equipment, and on this point Mr. McDonald presents the following communication from Dr. George S. Peck, the surgeon of the company:

"In order to render competent first aid to the injured, it is necessary to have a good building with at least two rooms as far away from the dirt of the works as possible, always

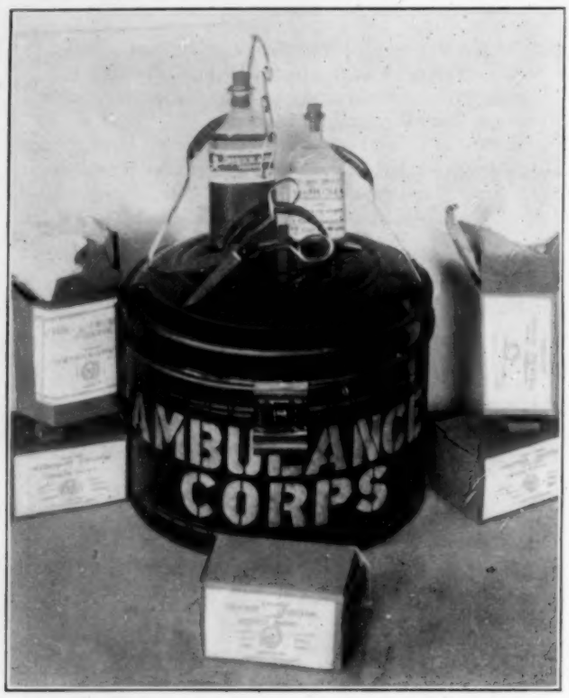


FIG. 2.—FIRST-AID BOX FOR DEPARTMENT USE AT WEST ALLIS SHOPS.

taking into consideration the convenience of conveying injured persons to dressing station. There should be a good stretcher in every department of the works. A man experienced in rendering first aid should be at the dressing station at all times.

"One room at the station should be furnished with one good couch, one up-to-date iron operating table, two good dust proof (iron and glass) instrument cases for the keeping of the instruments, and the necessary dressings and medicines. The necessary instruments are as follows: One good pocket case of instruments, one razor, two pairs of bandage scissors, three rubber tournequets for controlling hemorrhage, three or four enameled basins, three or four scrubbing brushes, towels, antiseptic tablets, aseptic gauze and cotton, gauze bandages from 1½ to 3 inches wide, and one hyperdermic syringe with tablets of morphine (grain ¼) and strychnine (grain 1-50). The second room should contain one or more beds."

The chief of the safety department of the Ohio Works of the National Steel Co. also sends in through Mr. McDonald an account of emergency work together with a complete list of the hospital supplies. This last item is omitted owing to the details being more useful to the expert surgeon, and the essential equipment having been generally enumerated by Dr. Peck. Mr. James A. Freed, of the safety department, says:

"Emergency hospitals for industrial works depend, as to the nature and extent of their equipment, on the purpose for which they are intended and that purpose is determined by the facilities of the community in which the works are situated in the matter of regularly established hospitals. Where there is a regular municipal or other hospital within reasonable distance of the works the emergency hospital need only be equipped for first aid attention and minor surgery. Where the works are so situated that access to such a regular hospital is not practical the emergency hospital should partake more of the nature of a regular hospital and be equipped for the performance of all surgical operations pertaining to accidental injuries.

"At this works it is comparatively easy to transport injured persons to the different hospitals of the city by means of buggies or ambulances and for this reason the organization of the emergency hospital is with the view of rendering only first aid attention to the seriously injured and the treatment of such minor injuries as do not require the services of a professional surgeon. The matter of first aid is in charge of the safety department of the works and the office of that department is at the emergency hospital. The hospital building is one story high and divided into an office and a first aid room. It is centrally located within the works and easy of access from all parts of the works and for buggies and ambulances. A trained male nurse is in attendance both day and night ready to render such services as may be required.

"The different parts of the works are well supplied with litters for the carrying of injured persons. The best for this purpose is the United States army litter. It is light, easy to handle, rolls up into a small package, is easily kept clean and can be depended upon. When a workman is injured he walks or is carried to the emergency hospital, where the necessary first aid attention is given him by the nurse, after which he is, if necessary, taken to one of the city hospitals in a buggy or ambulance. An ambulance or buggy is never called until the injured person has been seen by the nurse and the necessity of it determined and even then only called by a member of the safety department. When the injury is one that does not, of necessity, require the injured person to be sent to a hospital, the injury is dressed by the nurse and the injured person sent home in a buggy, walks home or returns to work as the case may be. When an injured person is sent to his home and is not able to come to the emergency hospital for secondary attention the surgeon is notified to call and see him.

"One of the important works of the emergency hospital is the secondary dressing of minor injuries, such as cuts, bruises, burns, scalds, sprains, contusions, etc. In such cases the injury is dressed daily, or as often as necessary, until completely cured. For this purpose the injured person returns to the emergency hospital from his home if incapacitated from work or comes in from his work if able to work. If the injury is sufficient to confine him to his home the surgeon attends him there. A supply of simple remedies are kept for the temporary alleviation of such cases of headache, toothache, cramps, etc., as make their appearance during working hours.

"A report of the first aid attention, nature and extent of the injury, how received, names of witnesses, etc., is made by the nurse on blank forms provided for that purpose. A full and complete record of every secondary attention is kept and affords a history of every case through its various stages. These reports and records often prove of great value. When, at any period of the treatment, an injury shows signs of infection or is not progressing as desired the injured person is at once sent

FIG. 3. AMBULANCE AT WEST ALLIS SHOPS.

to the surgeon with a card giving the history of the case and its treatment.

"Supplies for the emergency hospital are purchased in bulk and as far as possible in original packages. Bandages and gauze are bought by the bolt and rolled and sterilized by the nurse. The solutions used are also made by the nurse."

The Pratt & Letchworth Co.

The Pratt & Letchworth Co., of the Buffalo Malleable Iron &

Steel Works, at Buffalo, N. Y., has its plant located in the suburbs of the city, and from this point of view as well as the importance of the concern as a representative foundry and hence comparable with the others selected in the machinery and steel making fields, the following communication written by O. P. Letchworth, president of the company, will be of decided interest:

"Some years ago we installed a system in our plant for quick aid to the injured which has proved to be very efficient, and in extreme cases of very great value. This outfit does not represent any very great amount of expense, but its efficiency depends entirely upon the care in seeing that everything is kept in perfect order. We have outfits in two different parts of our plant, both easy of access, one in the office of the timekeeper, and the other further in the works. We have a small case about 3 feet high and 2 feet wide, with glass doors. That case we keep fully supplied with the following articles: Tincture of arnica for bruises, jamaica ginger for general use, camphor, peppermint, brandy, whiskey, witch hazel, unguentine for bruises (manufactured by the Norwich Pharmacal Co., of Norwich, N. Y.), ether sulphuric (a liquid composed of about 74 percent of ethyl oxide and about 26 percent of alcohol containing a little water), baking soda for burns, curative oil for burns, cocaine, flexible collodion, iodoform powdered, bichloride of mercury tablets for cleansing wounds, dioxogen (antiseptic), antiseptic iodoform gauze, assorted bandages, medicated cotton, adhesive plaster, isinglass plaster, two spoons, one pair scissors, two medicine glasses, and two tumblers.

FIG. 4.—LECTURE ROOM, AMBULANCE DEPARTMENT.

"The writer's attention was called to the necessity for this by seeing, some years ago, a man injured and the confusion that followed in the efforts to staunch the flow of blood, old dirty waste being brought into requisition. With this present arrangement all the facilities are conveniently at hand, and while we have had a number of very seriously injured men, we have had no case which proved fatal where the saving of life depended upon the application of speedy relief.

"In addition to the above we also have in the office of the timekeeper a stretcher so that in extreme cases a man can be brought with comfort to the office, and if necessary from there to the ambulance.

"In the line of preventives we are also about to install a system for boiling water, so that all employes of the plant will be provided with water which has been boiled, so as to destroy all typhoid germs.

"We have no special rules or regulations governing the treatment of emergency cases. Our man in charge of the gate, in whose room the principal case is located, has had some slight instructions from our physicians in regard to the best method of first aid to the injured in a very general and possibly a crude way, and has become somewhat expert in binding up small wounds, staunching the flow of blood and the application of proper temporary remedies in instances where burns occur.

"We have an arrangement with the branch of one of our hospitals, located near by, so that a telephone call is very promptly answered by a resident surgeon and we are able to bring to any injured man very quick medical aid, but aside from this we have no special arrangement."

The Brown & Sharpe Mfg. Co.

The Brown & Sharpe Mfg. Co., of Providence, R. I., sent a very interesting letter in reply to inquiries and took occasion to comment upon the shop method of treating the eyes. This is a matter of considerable delicacy and the letter is of corresponding value.

"Regarding the matter of first aid to the injured, our arrangements here are very primitive. We have supplied the larger departments with cases, which we have made up after our own ideas, containing bandages, cotton, antiseptic tablets, iodoform, carbolic acid, vaseline, and in the foundry we keep a bottle of carron oil, or picric acid, for the first treatment of burns.

"Our work is not of a particularly hazardous nature, and proximity to a score of physicians and the hospital makes arrangements unnecessary that are very desirable in many places.

"In the writer's opinion this matter of first aid to the injured is apt to be at either one of two extremes—either nothing done or too much attempted by unskilled people. Our intention here is to staunch a bleeding wound, and to apply such simples as to alleviate immediate pain and procure the services of a physician as soon as possible. An apparently slight wound oftentimes leads to blood poisoning and aggravated forms of troubles, while if properly taken care of in the first instance by an educated and trained man, it would have led to nothing more than temporary disablement and pain from the wound.

"Injury to the eyes is a very common trouble, but almost every shop has some men in it who are skilled in removing particles from the eye. A weak solution of borax is very acceptable, but the writer does not consider it a wise thing to use cocaine. Cocaine in the hands of ignorant persons is apt to do a great deal of harm, for the reason that it deadens pain, and is apt to deceive persons as to the true condition of the eye, the real cause of the trouble remaining all the time and making greater distress. When there is an irritation a solution of ten grains of borax in an ounce of camphor water is perfectly harmless, and acts as a mild lubricant, as it were, but does not deaden as does cocaine.

FIG. 5.—HOSPITAL AT ALLIS-CHALMERS SHOP, WEST ALLIS, WIS.

"Your suggestion regarding first aid to the injured, that such lessons should be given in the schools is very good. Here in our city the Young Men's Christian Association give a great many classes and among them is one class that is attended by people from the different parts of the city and has been very well taken care of. For the instructor in this they

have always had a physician who is interested in the general work of the association and one who has been of great service to them. We think this is right in the line of the association work, and undoubtedly you will find the same thing is being done elsewhere."

Army Hospital Corps' Instructions.

The litter employed by the U. S. Army Hospital Corps is in use by the safety department of the Ohio Steel Works and Furnaces and the drill which is followed in the army was also adopted by Dr. Lucast in his work at Milwaukee. The writer has had some correspondence therefore with the War Department and finds that the Hospital Corps Manual may be obtained from Louis C. Ferrell, Supt. of Public Documents, Union Bldg, Washington, D. C., at cost price plus 10 percent. The manual is a substantially bound book of 143 pages, 3½x5 inches, with 17 illustrations, giving considerable information in regard to first aid work. Major Kean, of the surgeon general's office, points out that some of the army instructions are directed at the treatment of penetrating wounds but that in other respects the manual would be of general shop usefulness. He suggests that the time honored remedy of carron oil is very satisfactory for burns as in foundry use, advises that a small amount of carbolic acid be added to it, as this drug by its anesthetic qualities relieves the pain and when combined with oil the amount of absorption is usually not sufficient to be dangerous.

A Surgeon's Suggestion.

An interview by a representative of *The Iron Trade Review* with a surgeon of considerable experience in hospital and ambulance work demonstrated that he was not so easily convinced that first-aid-to-the-injured facilities in shops and mills would be near so satisfactory as might be suggested from the report of Dr. Lucast and his experience at Milwaukee. This surgeon had a number of very interesting experiences, however, which would show that a more general knowledge of this kind would be of value particularly in the case of the police, whose duties make them prominent in the case of very many accidents. We quote him more freely as follows:

"The idea of having something of this sort is good enough and very well in its place, but there is always danger of going too far. I would not approve the use of cocaine by anyone but a doctor, though there seems little to be feared from the application of a 2 per cent solution to the eye. When it needs something of that kind it is best to discourage anything but a trip to the doctor, as it is really surprising how injuries apparently of little consequence may later on lead to very serious results. Of course flying chips are likely to get into the eye and a magnet or lodestone is useful and safe. A piece of soft paper or a camel's-hair brush are good. The former may be rolled up in a moment, moistened and employed with little chance of bringing about further inflammation, but the main thing is to get a man with the proper training at work on anything which seems serious enough for cocaine. Cocaine, like other drugs, varies in its effect upon different individuals. A fraction of 1 percent is quite noticeable, and I have a case on hand now in which the use of cocaine has done considerable injury.

"I would suggest a limit to the shop surgical equipment. Serious accidents are rare and when they happen people are willing enough to help, but as a rule they lose their heads. The fewer remedies the better, and for the same reason there should be the less instruction. I hope this much may be understood at least; in any serious case as, for example, a breaking of bones, etc., first send for the doctor. Keep fingers away from the wound; in case of heavy loss of blood, dust antiseptic powder on wound, apply compress, and bind with bandages tightly in position.

"Now, I have something to add by way of comment on these few instructions. There is no need of giving the doctor full details of the case over the telephone. Just tell him that one of the workmen has been hurt and he will do the rest. Then the second point: all shop wounds are septic, and on that account don't wash the wound; cut away the clothing, dust on the antiseptic powder from a cheese-cloth bag or a box or bottle with a perforated lid, apply the compress and by bandage or ligature stop the flow of blood. It is a good plan to lift the injured member when there is considerable flow of blood, and keep it elevated. It is quite surprising what an effect mere elevation has on the flow of blood.

"There cannot be too much care in handling men with broken bones. I have had a case where both legs had been broken by a street car accident, and by some mischance the police patrol wagon was sent for the man. Too hastily he was assumed to be a common drunkard, and the rough handling did not help his case. About all you can do is to make the man as comfortable as possible, and if it is necessary to move him, do it with due regard to the fact that the splintered bones are liable to cause and receive great injury if not delicately handled."

The Western Machinery Market.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, CHICAGO, March 31.

Reports from machinery manufacturers indicate a remarkably healthy condition of trade. Shops are crowded with work, deliveries are backward, night shifts are being put on or continued and plans made to increase outputs. If the year can be lived through without strikes, it is beyond question that 1903 will be the banner year. But fears are entertained by many that the year will see a repetition of the labor disturbances which for several months paralyzed the metal trades in 1901. The demands recently made by the Chicago brass molders and workers upon the Chicago Brass Manufacturers' Association are accepted as the forerunner of a series of alternatives to be formulated by other organized bodies in the metal trades; and it is hoped for the sake of harmony that the arrogant attitude of several labor leaders in recent public utterances does not represent the views of the rank and file of their organizations. The scarcity of skilled labor is already an important consideration, without further diminishing the hours that constitute a day's work; and the independent spirit of workmen towards night work, many refusing to perform it, is seriously embarrassing manufacturers in the West. The uncertainty regarding the labor situation is also retarding much needed extensions of many plants. Foundrymen are withholding contracts for supplies, and at the same time, refusing to make contracts with manufacturers for castings until they know more definitely what will be the result of the conferences to be held this spring between the Iron Molders' Union and the National Founders' Association on a working agreement for the coming fiscal year.

Notwithstanding the fears of a possible breach between employes and employers, trade in the West continues to grow by leaps and bounds. Many concerns did a business last year 100 percent greater than in the preceding year, and with favorable conditions they look for a greater proportionate increase in 1903. January and February were both auspicious months from a business standpoint. A large number of orders held up in the holiday season were closed in the latter month. The business of March has substantiated the predictions made by the sales in the first two months of the year; and what was at first regarded as an abnormal condition is fast becoming a permanent state of affairs. A drawback which has hampered manufacturers more seriously this year, is the uncertain condition of the supply of raw material. The belated deliveries of pig iron and fuel, and finished iron and steel caused by the unparalleled demands upon the resources of railroads, are creating considerable uneasiness among manufacturers in Western States. These, situated so far from the source of supply, suffer in greater proportion than firms located at points further east, from the delays of raw material in transit.

No branch of the machinery trade can be singled out as sharing in greater proportion in the general demand. It embraces builders of all kinds of engines, machine tools and shop equipment. Particularly noticeable is the crowded condition of manufacturers of heavy steam engines, punching and shearing machinery, gasoline engines and transmission machinery. The orders for rolling mill machinery of one local concern during the month just closed exceeded in value $1,000,000, including ten large blowing engines for iron and steel plants. Another manufacturer of Corliss engines in Milwaukee has had to with-

in deliveries and having orders booked ahead for a like distance in the future. Wood-working machinery is also in brisk demand, and as stocks are practically depleted manufacturers are able to keep in close touch with the immediate needs of the country. The demand for machine tools during the month has been chiefly for the heavier kinds, though a large amount of business has not been placed for the reason that deliveries cannot be obtained. Second-hand dealers on Canal St. report a great scarcity of light tools, and say that it is absolutely impossible to fulfill requirements in this line. The use of electrical machinery in plants operating any quantity of machine tools is also noticeably increasing, and builders of equipment of this kind report an abundance of orders. The Chicago & Rock Island inquiry for equipment for its new shops at Moline has not yet been placed, though contracts are expected to be awarded within a few days. The Chicago & Eastern Illinois Railroad has also come into the market for about $25,000 worth of new tools for its new shops at Danville, Ill., and it is intimated that other railroads will shortly enter the market for new equipment. Several concerns enumerated below contemplate placing orders for tools of various kinds, having plans under way for the erection of additions to their plants.

Allis-Chalmers Co., Chicago, reports that the aggregate value of orders booked during March for engines exceeded $1,000,000, the month having been a "record breaker" in point of sales for this class of equipment. Orders for the Gates rock and ore crushers have also been unprecedented in the history of the company, and in every other department an enormous volume of business has been transacted. Since the United States Steel Corporation announced its policy of improvements to be projected at various plants, the Allis-Chalmers Co. has received orders from it for seven large blowing engines, three of which are to be installed at the National Tube Works, McKeesport, Pa.; two at the National Steel Co.'s works, New Castle, Pa.; and two at the Edgar Thomson Works, Braddock, Pa. The company has also received an order for three large blowing engines from the Woodward Iron Co., Woodward, Ala.

The Chicago Pneumatic Tool Co., Chicago, states that orders for air compressors and pneumatic machinery of every description come in with gratifying regularity, not only from all portions of the United States, but from almost every corner of the civilized world. The business on the Pacific Coast has shown such increase that it has decided to appoint Henry Engels, who has been prominent in the pneumatic tool business for a number of years, as the general sales agent on the coast. Mr. Engels will have his headquarters with Messrs. Eccles & Smith, 91 Fremont St., San Francisco.

George Whiting Co., Chicago, finds a good inquiry for punches, shears and bending rolls, etc. Many of these inquiries are from concerns who are reequipping their plants with modern machinery, but a considerable number are from enterprises just embarking in business. Though the Whiting Co. recently enlarged its manufacturing facilities, it is contemplating further additions to its shop equipment. The labor situation in this city is threatening and serious, the president states, but notwithstanding this cloud on the business horizon, he is disposed to take an optimistic view of the future. Among the orders that have been received during the month are the following: McDowell, Stocker & Co., Chicago, one 42-inch punch with boilermaker's jaw; one 18-inch throat punch with structural jaw; one 12-inch throat punch with plain jaw; John Mohr & Sons, Chicago, one combined belt power riveter and punch with stake 49½ inches long; H. W. Caldwell & Sons Co., Chicago, one 12-inch punch with plain jaw; Jennet Bridge & Iron Works, Chicago, one 42-inch punch with structural jaw; N. Westover & Co., Lincoln, Neb., one 18-inch punch with structural jaw. The company has also received a large number of orders for attachments for its machines from purchasers who have had them in use, and in some instances these orders for attachments amount to more than the cost of ordinary machines.

American Machinery Co., Grand Rapids, Mich., is having a very satisfactory demand for pattern shop machinery, being compelled to operate its plant day and night to keep pace with the orders, which are largely for additional machinery in shops heretofore supplied, with a sprinkling of orders for new plants. From correspondence and reports with its representatives in all the large manufacturing centers, the company states that the prospects for business in the future are very flattering.

Wilmarth & Morman Co., Grand Rapids, Mich., reports that its sales of the "New Yankee" drill grinders during February were twice as heavy as those in the same month of the previous year. During that month among shipments of dry grinders were the following: Five to England and one to Holland; Harrison Machine Works, Belleville, Ill.; W. T. Pyne Mill & Supply Co., Louisville, Ky.; John Boyle Machine Co., Peabody, Mass.; Standard Wheel Co., Terre Haute, Ind.; Coleon Enameling & Stamping Co., Terre Haute, Ind.; Ashton Valve Co., Boston, Mass.; Howe Mfg. Co., Louisville, Ky.; Ferb Dieckman, Cincinnati, O.; C. J. Weiman & Co., Dayton, O.; Stedman's Foundry & Machine Works, Aurora, Ind.; Wm. Dill Works, Paterson, N. J.; Shepard Lathe Co., Cincinnati, O.; Fundicia de Fierro de Terreon R. R. shops, Torreon, Mex.; and wet grinders to Haisch Wire & Implement Co., Cairo, Ill.; B. D. Tillinghast, McDonald, Pa.; four to different shops of the Pennsylvania R. R. Co., and one direct connected motor-driven to the Coleon Mfg. Co., Terre Haute, Ind.

The Hawley Down Draft Furnace Co., Chicago, is meeting with such a heavy demand for the Schwartz brass and iron metal melting and refining furnaces that it contemplates erecting larger works in the near future. It has just installed a new traveling crane in its present shop, but as soon as plans for the new plant are decided upon, considerable new machinery will be required. The company has shipped a number of furnaces to Europe, among the plants equipped in England being those of the British Westinghouse Co., Manchester; Dewrance Co., London; and Johnson & Sons, bullion smelters, Finsbury, London. In Berlin, Germany, the Borsig Engine Works has adopted the Schwartz furnace.

Whiting Foundry Equipment Co., Harvey, Ill., has under contemplation the installation of a new power plant and is also increasing its shop equipment. Within the month, the company has shipped electric traveling cranes to shops of the Missouri Pacific R. R., Northern Pacific R. R., Atchison, Topeka & Santa Fe R. R. and Michigan Central R. R. Co. A three-motor electric traveling crane, 98-foot span, has also been installed in the McCormick plant of the International Harvester Co.

The Dings Electro-Magnetic Separator Co., Milwaukee, Wis., reports an increasing demand for its separators for use in iron and brass foundries. It has recently equipped a large plant in Glasgow, Scotland, with machines and reports many foreign inquiries.

Scully Steel & Iron Co., Chicago, is receiving orders for machinery from all parts of the United States, Canada and Mexico, and from inquiries pending, it believes that more new machinery will be purchased this year than in any previous year.

Maywood Foundry & Machine Co., Chicago, reports a brisk demand for the Maywood molding machines. Inquiries received, coming from conservative concerns, indicate that the advantages of molding machines are becoming more generally recognized. It has a large number of orders booked ahead, and shipments during the month included machines to the American District Steam Co., Lockport, N. Y.; Pennsylvania Malleable Co., Pittsburg; East Buffalo Iron Works, Buffalo, N. Y.; Buffalo Brake Beam Co., New York City; Acme Steel & Malleable Co., Buffalo, and others, besides shipments to England.

Union Drop Forge Co., Chicago, manufacturers of high grade steel drop forgings, has now in process of construction two 2,000-pound drop hammers, and two 3,000-pound drop hammers, which will soon be ready for installation. With this additional equipment, the company will have a capacity on drop forgings larger than it has ever produced. The business outlook is excellent, judged from the volume of orders and inquiries, and it sees nothing to change the situation for some time to come.

Hardinge Brothers, Chicago, manufacturers of Cataract precision bench lathes and attachments, watchmakers' tools, lathes, etc., are placing on the market a new automatic gear cutting machine. The firm has received a nice order from London, and reports that the domestic demand for its line of machinery and tools is sufficient to keep every department of its plant

running to full capacity. It has recently added a milling machine to its shop equipment.

Berlin Machine Works, Berlin, Wis., manufacturers of wood-working machinery, advises us that it is unable to take care of all the business offered, notwithstanding the fact that in the past two years it has doubled its capacity. Foreign trade is improving all the time, and from information it has at hand, believes it will be exceedingly brisk the latter part of the season. The outlook for domestic business is good, and as there is absolutely no accumulation of stocks in wood-working machinery, manufacturers are enabled to keep in close touch with the needs of the country. During the month, the company received an order from Russia by cablegram for a large bill of machinery, which, in view of the attitude of the government in taxing American machinery, it takes as a marked tribute to its line of tools.

William Ganschow, 35 South Canal St., Chicago, manufacturer of gears, expects to move into his new plant, which is a five-story building, at 12-14 South Clinton St., June 1. This will largely increase his capacity and enable him to cope with the growing demands of his trade. Two large automatic gear cutters are being added to his shop equipment, and three new machines of his own design, to be used in the cutting of gears, are also being constructed for installation in his new plant. During the month, an order will be placed for two 60-inch lathes for the turning of gear blanks and flywheels. Contracts have been placed for the power plant equipment for the new shops, which include a 150-h. p. New York Safety Steam Engine Co.'s high speed engine, direct connected to a 75-k. w. 220-volt Keystone Electric Co.'s generator, power being distributed to the various machines and floors by electric motors. All new tools will be direct connected. The new building is so constructed that any machine or gear up to 6 tons weight and 8 feet by 16 feet floor space, and not over 14 feet high, can be handled.

S. Freeman & Sons Mfg. Co., Racine, Wis., reports that it has purchased the patterns, patents and material from the A. P. Dickey Mfg. Co., of Racine, for the manufacture of the Racine Power Corn Shellers, and with this addition to its agricultural implement line, it expects to do a very large business. At the present time it is sold ahead for three or four months. In its boiler department, the business continues to increase, and plans have been made to build an addition to the boiler shop of 100x110 feet.

Nordberg Mfg. Co., Milwaukee, manufacturer of Corliss engines, etc., has practically withdrawn from the market, being several months behind in deliveries and booked months ahead for the full capacity of its present works. Contracts have been let for an extension to the machine shop of 100x220 feet, which is to be erected before May 6 next. The business outlook is very promising, the inquiries being more numerous than for several months. These come from all sections and from all lines of industry, being notable for the large number of small units wanted by concerns in country towns.

Joseph T. Ryerson & Son, Chicago, report that inquiries for machines for export increase each month, leaving no doubt that the American metal working tools have obtained a lasting foothold in many foreign countries. The domestic demand continues to be regarded as abnormal, though it is fast becoming a permanent condition, and the company suggests that prospective buyers should place their orders at least three or four months before the tools are actually required.

Roth Bros. & Co., Chicago, manufacturers of dynamos and electric motors, will move into larger quarters at 27-29 South Clinton St., May 1, the change having been necessitated by its increasing business. All the machinery in this plant will be equipped with individual motors, several tools having been specially designed for various uses. The business outlook for the year is so encouraging, that the company fears, even with its increased facilities, it will not have capacity enough to handle the trade offered.

Quincy Engine Works, Quincy, Ill., will build a 100-foot addition to its foundry some time this year. During March, a 750-h. p. vertical compound engine was shipped to the United States Government for installation in the Brooklyn Navy Yard, the engine being designed to drive two generators built by the Akron Electrical Mfg. Co., Akron, O. The company has also completed two 200-h. p. engines, equipped with rope wheels, to drive centrifugal pumps for the water works at Fort Worth, Texas, of which Daniel W. Mead, Chicago, is the engineer and contractor.

Fox Machine Co., Grand Rapids, Mich., reports that both its domestic and foreign trade has been very satisfactory, and that it is still behind on deliveries.

Armstrong Bros. Tool Co., Chicago, advises us that the months of February and March developed the heaviest business in tool holders in its experience. In the regular course of business, shipments are made to its agents in Great Britain, France, Germany, Austria, Norway and Russia, but during the past month these shipments have been exceptionally heavy. It is also finding a market in these countries for the Armstrong universal ratchet, which it recently began to manufacture. Gradual improvements are being made in the shape of additions of special tools from time to time, showing an increase of output without enlarging the plant itself, which was doubled in area of floor space about a year ago.

The Vilter Mfg. Co., Milwaukee, Wis., builders of refrigerating and ice making machinery, Corliss engines, brewers' machinery and bottling outfits, reports having closed large contracts in the past month. Much of this business was for refrigerating and ice-making plants. Among Corliss engine orders the following are mentioned: Shawmut-Clay Mfg. Co., Shawmut, Pa., 24x48; Garland & Williams, Devers, Tex., 18x42; W. Toepfer & Sons, Milwaukee, Wis., 12x30; W. W. Cargill Co., Green Bay Wis., 16x30; Racine Trunk Co., Racine, Wis., 14x30; Great Northern Molding Co., Chicago, Ill., 24x48; Hartman Trunk Co., Racine, Wis., 18x36; Winnebago Paper Mills, Neenah, Wis., 20x38x42 cross compound; B. D. Eisendrath Tanning Co., Racine, Wis., 20x42; Wisconsin Bridge & Iron Co., North Milwaukee, Wis., 15x36; P. Becker & Co., Chicago, 18x42; Skandia Furniture Co., Rockford, Ill., 22x42; Milwaukee Rubber Works Co., Cudaby, Wis., 22x42.

Engineering Arithmetic and Mensuration.

Engineering Arithmetic and Mensuration applied to the First Principles of Mechanical Science. By Chas. R. Honiball, M. I. M. E. Third edition. Chas. R. Honibal & Co., Liverpool, Eng.

The third edition of Honiball's Engineering Arithmetic and Mensuration is a portly volume of some 550 5x7½-inch pages. The work is published by Charles R. Honiball, manager of the Maritime Engine Works, at Liverpool, Eng., and lecturer in engineering at municipal technical schools of that city. The textbook was especially compiled for the use of students in science and technical schools, and is a natural outgrowth of the teaching requirements of the author. The problems given are practical in character, illustrative of those regularly encountered in the shop and with a few exceptions taken from the personal work of the compiler. The book will have an attraction to those who trust to the ordinary rules of arithmetic and mensuration for the ready solution of elementary problems in applied mechanics. The first section of the work deals with the rules of arithmetic and includes a chapter upon simple equations and formulæ together with numerous applications. Section 2 treats of elementary mensuration and the application of these rules embraces those laid down in the preceding section. The third section forms an easy introduction to the leading principles of mechanics. The author has prepared his material to excellent advantage and has given a thorough drill upon each step taken by the student. The printing has been arranged with a view to impressing the rules upon the memory with the best effect and to this end the more important clauses and words are in heavy faced type. The price of the work is 5 shillings net.

It is understood that a considerable part of the increase in capital stock of the Michigan Malleable Iron Co., Detroit, recently issued, was taken by the American Car & Foundry Co., and that the malleable iron works will be occupied to nearly their full capacity to supply the needs of the Car & Foundry Co. President McMillan of the Michigan Malleable Iron Co. has been quoted as saying that the idea of a combination of all the principal malleable concerns of the country has not been abandoned, and that there will be a meeting of malleable iron interests in April, at which the project will be thoroughly discussed.

RELIEVING DEVICE FOR MILLING CUTTERS.

BY ROBERT GRIMSHAW.

The illustrations show an attachment for relieving milling cutters, made by Emil Kegler, Düsseldorf. There are two eccentrically-bored arbors lying in adjustable bronze boxes, and carrying a spindle with an external cone for take-up and an internal one to receive the cutter arbor.

The eccentric arbors are adjustable with regard to each other to vary the relieving angle. The inner spindle is bored through for a right-and-left threaded rod which withdraws or sets in the cutter arbor. On a mandrel behind there is a lever and spur wheel actuated by an adjustable slide attached to the face plate of the lathe. This spur wheel carries the oscillating motion of the lever, by an intermediate wheel, to a gear wheel on the outer

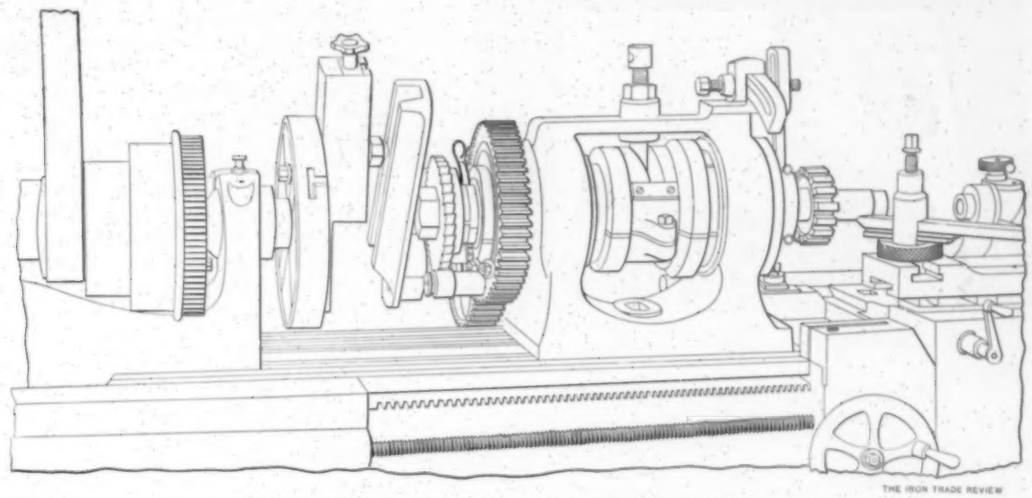


FIG. 1.—LATHE EQUIPPED WITH CUTTER RELIEVING ATTACHMENT.

eccentric arbor and thus to the latter and to the arbor eccentrically contained therein. On the last named gear wheel, adjustable in a concentric T slot, is a spring pawl that actuates a ratchet wheel on the main arbor when the eccentric shaft turns forward; i. e., the cutter then makes a partial rotation, equal to the tooth height, against the lathe tool. This movement completed, the eccentric arbors make a partial backward rotation, thus freeing the pawl from the ratchet. To prevent the main arbor being

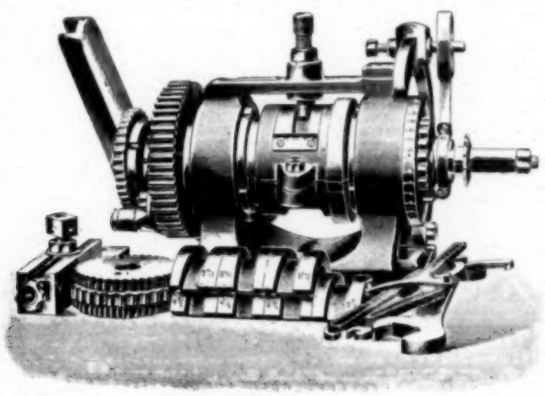


FIG. 2—.RELIEVING DEVICE.

turned backward by friction between it and the eccentric arbor, there is a cheek brake on the working side.

The main arbor retreats the amount of the eccentricity of the outer arbor, so that at the following forward rotation the next tooth will be relieved, and so on. The adjustable slide permits cutting to any desired tooth depth. Cutters of any number of teeth can be relieved on the back.

Another attachment, effecting side relief, has on the outer eccentric arbor an endways-movable bush in which there has its bearing a replaceable segment with milled thread. When the arbor turns, this thread gives a cam roller sidewise motion and forces the mill against the lathe tool.

Mr. Carnegie's Pittsburg Benefactions.

In appreciation of his endowment of the Andrew Carnegie relief fund, the employes of the Lucy furnaces of the Carnegie Steel Co., Pittsburg, have presented to Andrew Carnegie a handsomely engraved silver plate. Around the outer edge is a decoration of Scotch thistle, while the body of the plate bears a facsimile of two of the Lucy furnaces with stacks dated 1872 and 1877. These furnaces were the first owned by Mr. Carnegie. The resolutions adopted by the employes are inscribed in the center and read as follows:

Whereas, Mr. Andrew Carnegie, in his munificent philanthropy, has endowed the "Andrew Carnegie benefit fund," for the benefit of the employes of the Carnegie Co., therefore be it

Resolved, That the employes of Lucy furnaces, in special meeting assembled, do convey to Mr. Carnegie their sincere thanks for and appreciation of his unexcelled and bounteous endowment, and furthermore be it

Resolved, That it is their earnest wish and prayer that his life may be long spared to enjoy the fruits of his works.

Andrew Carnegie has again added an enormous amount of money to his benefactions for Pittsburg. He has consented to increase his gift for additions to the Carnegie Institute by $1,400,000, making the grand total of the cost of the additions $5,000,000, and has also donated $150,000 for the erection of a branch library in the East End, Pittsburg.

The Iron City Engineering Co., of Pittsburg, has been awarded the contract for the entire electric work to be installed in the Stoneleigh Court, Washington, D. C.

The Pressed Steel Car Co. has removed its offices from the Tradesmen's Building to the Farmers Bank Building, Fifth Ave. and Wood St., Pittsburg, where it has secured more commodious quarters. The company has the entire nineteenth floor.

The Banner Iron Works, of St. Louis, is a corporation organized in February, 1901, for the purpose of manufacturing ornamental and structural iron and steel for buildings, and also to do general foundry work. The following gentlemen are interested in the company: Albert G. Fish, president, former vice president Koken Iron Works; H. A. Frielingsdorf, vice president, former estimator Koken Iron Works; E. C. F. Koken, secretary and treasurer; Wm. T. Koken, Jr., superintendent, and Chas. W. Koppen, former foundry superintendent Koken Iron Works. The following is a list of fire-proof buildings in St. Louis, Mo., on which the Banner works had contract for the iron work: Wm. Lemp Brewing Co., Anheuser-Busch Brewing Co., Columbia Brewing Co., Commonwealth Trust Co. Bldg., St. Luke's Hospital Bldgs., St. Louis Transit Co.'s Power House, fire-proof buildings outside of St. Louis, City National Bank, Dallas, Texas; Lone Star Brewing Co., San Antonio, Tex.; Des Loge Consolidated Lead Works, Des Loge, Mo.; Swift & Co., Ft. Worth, Tex.

THE NATIONAL MACHINE CO.'S NEW SPEED LATHE.

A new 12-inch by 5-foot plain speed lathe made by the National Machine Co., of Milwaukee, Wis., is shown in the accompanying illustrations. These speed lathes are regularly made in 4, 5, and 6-foot lengths, but any desired length of bed can be supplied to order. The general design of the tool is unusually strong as well as of a graceful type, and the supporting members have been placed so as to afford the maximum amount of stability consistent with due economy of floor space.

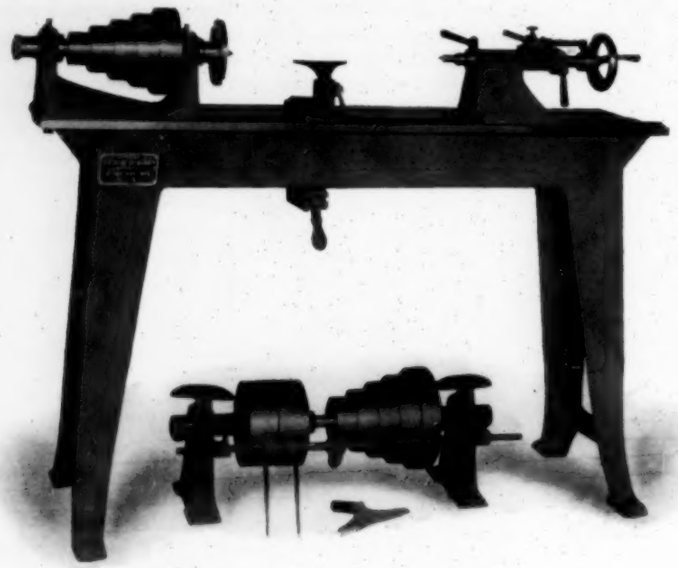


FIG. 1.—THE NATIONAL MACHINE CO.'S NEW SPEED LATHE.

There is probably less room for originality in the construction of a speed lathe than in the arrangement of any other shop tool, so that one does not look for any special novelties in construction which may not be suggested in some manufacturing machine or another. Nevertheless, the present tool is in the finished form, as illustrated, the product of a series of very careful tests, and the design has been handled, amended, and perfected by several mechanics of ability.

The front way is V-shaped, and the back one is flat. The head stock is equipped with a five-step cone for a 1¼-inch belt, and is turned inside and out, so that it may be in perfect balance at any speed. The spindle is made of special steel and has a 9-16-inch hole through the entire length. It runs in bronze bearings provided with dust-proof oil cups. The bearings are long and of ample dimensions to withstand the high speed at which such lathes are usually run. The rear box is provided with a take up device which can be easily adjusted for end wear.

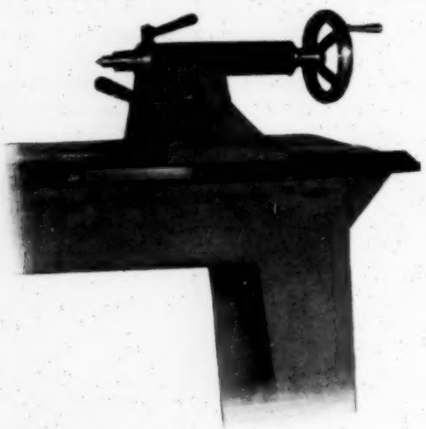


FIG. 2.—THE PLAIN TAIL STOCK.

The support for the rest is secured to the bed by a cam clamp. The use of set screws for holding the shank of the T-rest in the holder is common enough in machines of this character, but the plan has disadvantages because the point of the set screw bears upon the shank in a way which may cause the tool to hold together in any but a convenient manner, and should the set screw wear a cavity into the shank and also rough up the surface there is always the annoying possibility of the point of the screw failing to hold the rest securely when the operator wishes to make a change in the arrangement of the parts. For these reasons the T-rest is on this lathe held in the holder by a clamping device which binds the one piece firmly around the other and makes a very solid and workmanlike construction.

The tail stock is of the cut-away pattern, and is also rigidly clamped to the bed by a cam clamp operated on the rear side where it is out of the way. The spindle is actuated by a screw and hand wheel on the one type of machine, but a combination screw and lever motion can be obtained, as shown in the illustration, and the lever may be lifted off when not desired. The lever employed on the combination tail stock is knurled to insure a firm grip, and is held in any desired position by a binding screw and clamp which may be quickly set in place.

The set-over tail stock, which is also illustrated, has double spindles, each traveling 5 inches, making a total of 10 inches. The travel of the outer spindle is conveniently operated by a lever connected to a rack and pinion, and the inner spindle is worked by means of a screw and hand wheel. Both spindles can be rigidly clamped in position, and with the attachment the tail stock is capable of boring and facing up 8½ inches in diameter.

The centers are large, hardened and ground, and will take 34 inches between them. There is a shelf securely fastened to the bed the entire length of the machine. The countershaft is provided with tight and loose pulleys, 8 inches in diameter, and will take a belt 2½ inches wide. Friction pulleys can be furnished in place of tight or loose pulleys when desired.

A slide rest is manufactured for use on this type of machine, and as will be seen by the illustration, is of very substantial construction. The swivel plate is carefully graduated to facilitate setting the slide to any desired angle. The slide has both longtitudinal and cross feeds. The sliding surfaces are scraped to an accurate bearing and are provided with steel gibs to take up the wear. Both the operating screws are well protected from chips and dirt, and the handles on the longitudinal feed screw can be changed to either end as is most convenient for the workman. Careful attention has been given to the question of lubrication, and the arrangements for this purpose are thoroughly effective.

FIG. 3.—THE SET-OVER TAIL STOCK.

Cincinnati Machinery Market.

March 31.

Trade conditions among the machinery interests continue active and orders for March were of as good volume as during February. The machine tool builders have had two months of heavy business and the outlook for the future is encouraging. Orders are still of widely distributed character and in the regular lines. There has been no improvement in foreign business and nothing new in this direction has developed. Railroads, electrical companies and concerns making large engines and machines are heavy buyers, and this city is getting its share of the business. Local foundries appear to take care of the requirements of machine builders reasonably well, but it has been necessary to place a few orders with outside foundries from time to time.

Many of the contemplated extensions and additions to plants, are now under way and some are nearing completion. The tone of the whole trade is good and all reports are satisfactory in tenor.

The Rahn-Mayer-Carpenter Co. is breaking ground for its 60x150 feet, one story, frame addition to its factory. The addition is to be used as an erecting shop for heavy tools. The building will be completed in about two months.

The John Steptoe Shaper Co. has contracted for ten or twelve new machines to be installed in the new building, which will be an addition to the lately finished plant which is now in full operation. The plans for the new building have not yet

FIG. 4.—COMPOUND SLIDE REST.

been made as the company expects to arrange the structure to suit the additional machines to be installed. The company reports business good and is well supplied with orders.

The Cincinnati Shaper Co. reports everything running in good shape, orders in satisfactory volume and outlook for a continuance of good business encouraging.

Greaves, Klusman & Co. have found it necessary to enlarge their facilities to accommodate the volume of business coming in. They have nearly completed a two-story brick addition to their plant which gives them about 1,500 square feet enlargement. They are arranging to put on larger working force. They report business continuing good.

The Cincinnati Planer Co. reports a continuance of good business with well distributed orders from all sources. No change in general conditions and everything entirely satisfactory.

Schumacher & Boye tersely express conditions as business good and everything just the way it should be.

The Lodge & Shipley Machine Tool Co. reports trade conditions in the machine tool business as lively as heretofore. Nearly all railroads, electrical companies, and industrial concerns, making large engines are heavy buyers. Foundries are taking good care of the requirements of machine builders and supplies of steel, etc., seem to be reasonably free of access. The whole situation has a pleasing look that is very encouraging to the manufacturer.

The Watkins Laundry Machinery Co. has increased its capital stock to $100,000. The increased capital is to be used in enlarging the capacity of the plant.

The Cincinnati machinery interests will be well represented at the annual convention of the National Metal Trades Association at Buffalo, N. Y. A special sleeper has been engaged and the party will travel over the Big Four. Among those who will go from this city are Fred A. Geier, of the Cincinnati Milling Machine Co.; E. H. Hargrave, of the Cincinnati Tool Co.; Benj. Sebastian, of the Sebastian Lathe Co.; J. C. Hobart, of the Triumph Electric Co.; H. C. Hoefinghoff, of the Bickford Drill & Tool Co.; H. M. Norris, of the Bickford Drill & Tool Co.; H. Ritter, of the Lunkenheimer Co.; S. E. Egan, of the J. A. Fay & Egan Co.; P. G. Marsh, of the Cincinnati Shaper Co.; F. W. Boyle, of Schumacher & Boyle; Napoleon DuBrul, of Miller, DuBrul & Peters· C. F. Mayer, of the Rahn-Mayer-Carpenter Co.; William Lodge, of the Lodge & Shipley Machine Tool Co.; E. F. DuBrul, vice president of the National Metal Trades Association; Robert Wuest, secretary of National Metal Trades Association.

Philip C. Fosdick, of the Fosdick & Holloway Machine Tool Co., is elected president of the Manufacturers' Club for the ensuing year. This organization has a membership of the most representative men in Cincinnati in manufacturing lines and the presidency of this club is an honorable distincton.

The New Industries Committee of the Industrial Bureau are working on a proposition for the location in this city of a large rolling mill. Mr. William Lodge, of the Lodge & Shipley Machine Tool Co., is the chairman of this committee and is much interested in the project. He will make a thorough investigation of the proposition and will go out of the city to confer with the parties who are considering this city as a location.

On the occasion of the annual convention of the National Association of Manufacturers to be held in New Orleans, April 14-16, a joint committee representing eighteen commercial bodies of this city has arranged for a special excursion to the Crescent City. The machinery men will be strongly represented on this occasion. The following are among those who will make the trip: Jacob Dietz, of the Dietz Machine Tool Co.; Wm. Lodge, of the Lodge & Shipley Machine Tool Co.; J. C. Hobart, of the Triumph Electric Co.; E. H. Hargrave, of the Cincinnati Tool Co.; F. A. Geier, of the Cincinnati Milling Machine Co.; C. H. M. Atkins, of the Warner Elevator Co.; R. K. LeBlond, of the R. K. LeBlond Machine Tool Co.; F. G. Bolles, of the Bullock Electric Co.; B. B. Quillen, of the Cincinnati Planer Co.; H. C. Hoefinghoff, of the Bickford Drill & Tool Co.; E. E. Greenwald, of the I. & E. Greenwald Co.; A. H. Tuechter, of the Cincinnati Machine Tool Co.; J. Freidenstein, European agent of the Cincinnati Tool Co.; E. F. DuBrul, commissioner of the National Metal Trades Association, and Robt. Wuest, secretary of the same organization. Wm. Turner, of Matthew Addy & Co., pig iron sales agents, will also be in the party. The trip will take one week and stops will be made at New Orleans, Mobile, Pensacola, Montgomery, Birmingham and perhaps some other points along the route.

The machine tool manufacturers of this city are making plans to have a large exhibit of Cincinnati made machines at the St. Louis exposition. Already a number of concerns have engaged space and commenced work on their material for the exhibits. It is estimated that about 50,000 square feet of space will be taken. Among the concerns that have already engaged space are the Bickford Drill & Tool Co., the Lane & Bodley Co., the American Tool Works Co., the Lodge & Shipley Co., the Cincinnati Milling Machine Co., and the Bullock Electric Co.

The Latta & Martin Pump Co., Hickory, N. C., which recently increased its capital from $24,000 to $50,000, doubled its capacity some time ago and does not intend to build at present. It manufactures pneumatic displacement pumps and is always in the market for air compressors, handling from 50 to 100 of these annually. The company also uses large numbers of black cylinders, ranging in size from 14x36 to 20x60, using on an average of about 200 of these annually. The company would like to have quotations from any parties on the above and on any other supplies, such as brass and copper, and iron fittings.

The American Sheet Steel Co. has been temporarily enjoined from removing its plant from Dennison, O. The petition was filed by a number of business men from that town. The petitioners allege that the company made a contract some time ago not to remove the mill, but is now attempting to do so.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Ventura Manufacturing & Implement Co., Ventura, Cal., recently incorporated, was organized for the purpose of manufacturing and placing on the market, a patented nut wrench for the cylinder of threshing machines; also a patented belt guide for threshing machines; also for the purpose of manufacturing general farming machinery. The company will eventually build and remove to larger quarters. For the present all the machinery it will require will be for the purposes above stated.

The Watkins Laundry Machinery Co., Cincinnati, capital $100,000, has been incorporated by Leonard S. Smith, Ethan B. Stanley, Arthur M. Peck, Hiram D. Peck and Frank H. Shaffer.

The Oil Burner Furnace Co., Milwaukee, has been incorporated with a capital of $60,000.

Biscoe Foundry & Machine Co., Biscoe, N. C., has increased its capital to $10,000.

The Carolina Steel Bridge & Construction Co., Burlington, N. C., with a capital of $100,000, has completed its organization, electing E. P. Wharton, of Greensboro, N. C., president and M. E. Montsinger, secretary and treasurer. The company had leased buildings and grounds and is installing a complete plant for the manufacture of steel bridges and work of a similar character.

The Robinson-Tilton Machinery Co., Columbus, O., has been incorporated with a capital of $25,000, by S. W. Robinson, C. H. Tilton, E. G. Robinson, C. O. Haines, and M. E. Thrailkill.

The German-Russell Co., Cincinnati, O., with a capital of $15,000, has been incorporated to manufacture machinery. The incorporators are: Collins M. German, Samuel B. Queal, John A. Russell, Joseph German and Emma C. Queal.

The Attica Foundry & Machine Co., Attica, O., with a capital of $5,000, has been incorporated by Warren R. Hall, Harry G. Blaine, F. A. Windnagle, Jacob Windnagle, John Hall and J. F. Smith.

Rear Admiral Endicott, Chief of the Bureau of Yards and Docks, has invited estimates for brick and steel machine, boiler and blacksmith shops at the Charleston, S. C., Navy Yard, for which Congress has appropriated $342,000. Bids are due in Washington April 4.

The John Wishart Machine Works, Chicago, capital $7,000, has been incorporated to manufacture machinery.

The Hohenstein Marine Water Tube Boiler Co., New York, has been incorporated with a capital of $1,000. The directors are: A. G. Hohenstein, Washington; F. C. Bushnall, New Haven, and D. J. Geary, Oil City.

The American Machine Co., Norfolk, Va., has been incorporated to manufacture machinery. The officers are: H. B. Goodrich, president; W. C. Cobb, vice president; A. A. Dawes, secretary and treasurer; M. R. Land, general manager, and George Pilcher, counsel.

The American Engineering & Foundry Co. Los Angeles, Cal., has been incorporated with a capital of $100,000. The directors are: Alpheus Redman, W. E. B. Partridge, W. D. Partridge, G. Davis, Richard J. Dillon.

The Cambridge Byesville Steel Co., Cambridge, O., has been incorporated under the laws of West Virginia. The authorized capital stock of $100,000, which is held by C. L. Bailey, of Marietta, O.; J. F. Schieper, of Pittsburg, Pa.; A. A. Taylor, John S. Black, and Lakin C. Taylor, of Cambridge, O.

The Wisconsin Foundry & Steel Works, Cedar Grove, Wis., has increased its capital stock from $25,000 to $50,000.

Application has been made by Johnston & Felconbridge, of Toronto, for the incorporation of the Steel Corporation of Canada.

Warner & Haviland, New York City, have formed a company to manufacture iron and steel. Capital, $25,000. The directors are Norman Warner, of Rye; J. E. Haviland, of Port Chester, and Somers Foster, of New York City.

The Baxter Rail Joint Co., Richmond, Va., has been incorporated to manufacture railroad appliances. Capital, $10,000.

The Meeker's Union Foundry Corporation, of Norwalk, Conn., has been incorporated with a capital of $20,000.

The Cross Engineering Co., Carbondale, Pa., has been incorporated with a capital of $100,000, to manufacture steel and iron.

The Cameron Tool Co., Cameron, W. Va., has been incorporated with a capital of $10,000 to manufacture and repair boilers, engines, tools and machinery.

The Virginia Hardwood Mfg. Co, Browntown, Va., wants 20 to 30-horsepower locomotive-type portable boiler and engine combined.

W. H. Gibbes & Co., Columbia, S. C., are in the market for 12x16 heavy slide-valve engine and a 60 to 70-horsepower arch-front return tubular boiler.

Thomas T. Jenkins, Carrsville, Va., wants 25-horsepower engine.

C. N. De Witt Motor Co., Fort Worth, Texas, will need complete machine shop and foundry equipment; also cast and wrought iron steel shafting, steel framing for building, etc.

Charleston Boiler & Foundry Co., Charleston, W. Va., will want power rails to roll three-quarter-inch plate, 10 or 12 inches between housings, blower fan complete, and lining for 48-inch cupola (brick).

Moncrief Furnace & Foundry Co., Atlanta, Ga., will need some additional machinery for foundry.

B. J. Robinson's Gin & Machine Works, Vicksburg, Mass., is in the market for a large lathe, about 40 or 42 inches by 20 feet; planer, 30x30x8 or 10; bolt cutter to cut from ½ to 1½.

W. C. Wilson, 909 Milton Place, Baltimore, Md., wants to buy hand milling machine, sensitive drill and medium size safe.

Richards Machine Co., 64 South Forsyth St., Atlanta, Ga., needs complete outfit for machine shops.

The Circleville Lifting Jack Co., Circleville, O., has been incorporated with a capital of $10,000 by W. G. Jacobs, Irwin Boggs, W. T. Bell, C. G. Shulz and Samuel W. Courtright.

The Weaver Coal & Coke Co., Belington, W. Va., has been incorporated to deal in coal and coke, minerals, ores and other products, and to own and operate railway cars, engines, and all machinery, appliances and appurtenances therewith. Incorporators are: Henry E. W. Weaver, C. A. Bickett, Thomas Gahan, Henry L. Stein, William France Anderson, all of Chicago, Ill.

The Bovic Car Co., Chicago, has been incorporated with a capital of $25,000, to manufacture and operate stock cars, refrigerator cars, etc. Incorporators are: Frederick S. Winston, S. W. Strawn, R. M. Shaw, James Miles, John D. Black, all of Chicago.

The American Roller Bearing Co. has been organized at Augusta, Me., to deal in machinery. Capital stock is $1,000,000, of which nothing as yet has been paid in. Promotors are: Charles G. McCutchen, Brookline, Mass.; Edward D. Lambert, Frank A. Vaughan, Cambridge, Mass.; Frederick B. Hill, Newton Centre, Mass.; Frank L. Dutton, E. F. Whittum, Charles L. Andrews, Fred W. Lee, E. M. Thompson, Augusta. Frederick B. Hill is president and E. F. Whittum treasurer.

The Buxton Engine & Machine Works, Nashville, Tenn., has been incorporated with a capital of $250,000. The officers are: President, Alfred Buxton; treasurer, C. A. Hough; resident directors, A. C. Buxton, C. A. Hough and L. E. Lentry.

The Todd Mfg. Co., Toledo, O., has been incorporated under the laws of Arizona with a capital of $100,000. The company will erect a plant for the manufacture of motor parts, automobiles, bicycle spring forks, etc. The officers are: President, S. S. Thorn; vice president and general manager, J. D. Todd; secretary, J. D. Crawford.

Fires and Accidents:—

The billet mill of the Wickwire Bros.' plant at Cortland, N. Y., was damaged by fire to the extent of $3,000 last week.

A large part of the car building plant of the Pennsylvania Railroad, Fort Wayne, Ind., was destroyed by fire March 24th; loss $75,000.

Fire in the stockhouse of the American Brake Co.'s plant,

St. Louis, caused damage to the amount of $4,000 to the building and material. The damage is covered by insurance.

New Construction:

The Washington Iron Works Co., Seattle, Wash., is making the following additions to its plant: Foundry addition 60x72 feet, with one additional cupola, cranes, etc.; new machine shop, 70x240 feet, with addition 56x106 feet; main building, two stories, with basement under the entire building. The shop will be equipped with a 4-motor traveling crane, 40-foot span of 25 tons capacity, which is being made by the Morgan Engineering Works, Alliance, O. The shop will be equipped with up-to-date machinery which will be driven throughout by electric motors. The building is well under way. It will be completed and in operation by June 1.

The Niagara Falls Machine & Foundry Co., Niagara Falls, Canada, has its foundry erected with a capacity of 15 tons per day. The main building is 53x75 outside the annex, core oven 14x20. The company's principal work is getting out the heavy work in castings weighing from 6 tons up for the large power companies on the Canadian side. The company purchased most of its outfit for its foundry from the J. D. Smith Foundry Supply Co., of Cleveland. The officers of the company are: O. D. Glasgow, president; H. A. Campaigne, vice president; J. F. Quillinan, secretary-treasurer; Geo. W. Hoak, superintendent.

R. J. Schwab, Clinton St., Milwaukee, is planning for the erection of a new foundry building.

The Kansas City Bolt & Nut Co., Kansas City, Mo., is having plans prepared for improvements to its plant. Gas engines and generators will be required.

H. E. Thompson, 228 Fifth Ave., Louisville, Ky., will expend about $12,000 for remodeling a building into a foundry.

Work on the construction of the new building at Ensley, Ala., for the Empire Plow Co., Cleveland, has been begun.

The Southern Saw Works, East Point, Ga., will expend about $500,000 for improvements.

A new National theatre is to be built in Mexico City. Adam Boin is the architect. Steel structural material will be used.

The American Car & Foundry Co. has had plans prepared for a new power building for its plant in Detroit.

Edward Harrington Sons & Co. has had plans prepared for a new foundry building on the site of the old Continental Market, Philadelphia. The present plant of the Harrington firm at 15th St. and the Reading Subway has been sold, it is said, to the Baldwin Locomotive Works, which immediately adjoins it.

The Gadsden Pipe & Foundry Co., Gadsden, Ala., will build a machine shop 40x80 feet.

The Toledo Machine & Tool Co., Toledo, O., has let contracts for the erection of its new plant.

The plant which the Pease Car & Locomotive Works will build at Hagewisch, Ill., will cost about $1,500,000. Bids for the construction of the buildings are now being received. In the group will be an erecting house, 200x400 feet, iron, two stories; power house, 96x156 feet, brick, two stories; planing mill, 150x300 feet, one story.

Wright & Coltman, Palmer, Mass., will build an addition 50x30 feet to their wire mill.

The Wilks Foundry Co., Toledo, O., expects to have a new addition to its plant in operation by June 15th. The addition will more than double the capacity of the plant and will cost about $35,000.

The Brylgon Steel Co., Reading, Pa., will erect a plant 400x180 at New Castle, Del. The site faces on the river front with a large wharf to be built out into the river.

The Malleable Iron Co., South Park, Minn., will shortly begin the erection of an addition to its foundry which will double the output.

The new plant of the Susquehanna Iron & Steel Co., Columbia, Pa., will have a capacity of 150 tons daily of lapwell pipe from 2 to 10 inches and will cost about $600,000. It will have electrical equipment throughout.

The St. Paul Railway Supply Co., St. Paul, Minn., intends to build a new plant. Details are not ready to be announced.

Preliminary work for the blast furnace and tube mill to be built by the United States Steel Corporation at Lorain has been begun. A force of men with teams is now grading for the railroad tracks to be laid for use in delivering material for the new furnaces. Several carloads of wheelbarrows, shovels, plows, etc., have been received, and it is expected that within a few days about 1,000 men will be employed.

The Morewood Works, Danelly, South Wales, operated by Richard Thomas & Co., will be remodeled on American lines. New engines will be installed including a reversing engine, and new equipment will be put in the bar mills. Three open-hearth furnaces will be built.

The N. & G. Taylor Co., Philadelphia, which some time ago leased the Maryland Sheet & Steel Co.'s plant at Cumberland, has formulated plans for extensive improvements, which include increase in capacity of the open-hearth furnaces, erection of a second 20-ton open-hearth furnace blooming mill and installation of two additional ladles.

The directors of the Portland Iron & Steel Co. have decided to rebuild the plant at Portland, Me., which was destroyed by fire last August.

The Chicago & Eastern Illinois Railroad Co. has completed the plans for the car shops to be erected at Danville, Ill. The buildings will comprise a machine shop, 16x121 feet; blacksmith shop, 136x100 feet; boiler shop, 204x199 feet; power house, 100x89 feet. The cost is estimated at $163,000.

The American Ship Windlass Co., Providence, R. I., will build a foundry, one story, 105x155 feet.

A. L. Humphrey, superintendent of motive power of the Bloomington & Quincy Railroad, has recommended that $100,000 be expended for shop machinery at Bloomington, Ill., and an equal sum for the erection of new shop buildings.

The Duplex Foundry Co., Elyria, O., has awarded contracts for two new buildings, one for the office and shipping department and the other for the foundry.

E. J. Codd will erect a boiler shop on Caroline St. between Alicenna and Lancaster Sts., Baltimore, to cost $3,000.

The Grand Trunk Railway Co. has bought land at Stratford, Ontario, and has an option on other property, the object being to enlarge its shops, and possibly to erect a new station.

The Sheffield Car Co., Three Rivers, Mich., has the foundation laid for a two-story brick shop 250x95 feet.

Work at the plant of the American Car & Foundry Co., at Berwick, Pa., is progressing rapidly and in all departments of the concern 2,561 men and boys are now on the pay roll. The new steel car plant is nearly completed and in a few weeks will be turning out cars at the rate of ten per day. When the new plant is in full operation about 5,000 men will be employed.

The Ornamental Iron & Wire Co. has decided to move from Chattanooga, Tenn., to Portsmouth, Va., citizens of the latter city having subscribed $25,000 of the company's bonds.

Castree & Son are building an addition to their machine shop on North Howell St., Owosso, Mich.

The Matheson Motor Car Co., Ltd., Grand Rapids, Mich., has in mind building this fall a plant with 50,000 feet floor space, one story high, with glass roof. The company intends to make this plant a model so far as possible for the manufacture of high speed gasoline automobiles.

The Litchfield Mfg. Co., Webster City, Iowa, expects to erect a new plant at Waterloo, Iowa, during the summer. The company will probably have the new plant in working order by Sept. 1st. The increased demand for its line and the addition of new lines, and a larger territory have necessitated this change.

The ordinance granting the South Side Elevated Railroad in Chicago the right to build extensions having become operative, the company is beginning to figure on the plans for the proposed new construction. It is expected that additional stock amounting to six or seven million dollars will be issued. The first year will be occupied in preparation, owing to the inability to get orders executed at the steel mills for a year. It is proposed to build as rapidly as possible after deliveries of structural material begin.

The Western Electric Co. has purchased a tract of 100 acres in one of the suburbs of Chicago, and will erect a plant having floor space of 150,000 square feet. There will be a large machine shop and foundry, and a power plant of 4,000 h. p. About 1,200 men will be employed. The improvements are to be in addition to the plant of the same company on the west side

of Chicago, where it has about $3,000,000 invested in buildings, and is spending about $500,000 for additional buildings.

The Altoona Foundry & Machine Co., Altoona, Pa., is enlarging its plant. The new wing now being erected is 30x70 feet. The plans have also been prepared for the erection of a new gray iron foundry 66x170 feet, a cleaning room 50x60 feet, core room 40x48 feet, and a cupola building 35x50 feet.

The Randle Machine Co. will erect a $20,000 plant at Cumminsville, near Cincinnati.

The capacity of the plant of the Railway Steel Spring Co., at Oswego, N. Y., will be doubled within 60 days. The plans call for the rearrangement of the present plant, and the making of several additions, as well as the installation of new machinery.

The Pittsburg District:—

The new open-hearth plant and rolling mill of the Sharon Steel Hoop Co., Sharon, Pa., will be placed in operation about April 15. The open-hearth plant contains four 30-ton furnaces and will have a daily output of about 300 tons. The rolling mill contains a blooming mill and combination billet and sheet bar mill. About 125 tons of the steel produced will be used in the hoop and cotton tie mill now operated, while the remainder of the steel will be disposed of in the open market.

The W. B. Pollock Co., of Youngstown, O., has been awarded the contract for the erection of the new blast furnace at Youngstown, O., for the National Steel Co. The contract covers all the structural and plate work on the stack proper and the stoves, together with the cast house and engine room.

The Pittsburg office of Matthew Addy & Co., Eliot A. Kebler, resident agent, has been removed from the Second National Bank Building to room 629, Farmers' Bank Building.

Circular notices have been sent stockholders of the Westinghouse Machine Co., Pittsburg, stating that the capital will be increased from $3,000,000 to $5,000,000, as was voted more than a year ago, but upon which no action was taken at that time. The stock will be issued at $100 per share, par value $50.

The South Pittsburg Iron Works, with offices in the Frick Building, Pittsburg, and recently organized at Claysville, Pa., to manufacture bridges, buildings and other structural work, has taken over the business of the Claysville Foundry & Mfg. Co. A foundry building 141x65 feet is well under way, while work is progressing rapidly on another building which will be 180x80 feet.

W. N. Kratzer & Co., operating a structural iron works on Smallman St., Pittsburg, have commenced work on the erection of an addition 19x100 feet. A 10-ton traveling crane is also being installed.

The American Bridge Co. last week broke ground for the erection of a 3½ story building which is to serve as the headquarters for its large force of engineers, on the site of its new plant at Ambridge, Pa. The building will be 232x214 feet and will contain 270 rooms.

The United States Screw, Nail, Wire & Machine Co. has been organized at Altoona, Pa., to manufacture a nail making machine invented by E. E. Graeff, of Altoona. The new company will probably be capitalized at $300,000.

All tonnage records were broken at the Shenango Valley mill of the National Steel Co., New Castle, Pa., last week when 1,629 tons of billets and sheet bars were rolled. This breaks the previous record of this mill by several hundred tons.

James Stewart & Co., of Pittsburg, building contractors, have been awarded the contract for the erection of the extension to the Hotel Savoy, London, Eng., at a cost of about $1,500,000. The work is to be completed in a year.

The Washington Foundry & Machine Co., Washington, Pa., has been incorporated with $20,000 capital by H. G. Manning, T. F. Birch and George L. Davis.

The wooden structure containing the 8 and 10-inch guide mills of the Brown-Bonnell plant of the Republic Iron & Steel Co. at Youngstown, O., was badly damaged by fire last week, the loss being estimated at about $5,000. The machinery was not damaged to any great extent, however, and operations were resumed this week.

Plans are now being prepared for the erection of a number of additional departments to the plant of the Altoona Foundry & Machine Co., Altoona, Pa. The cleaning room will be 50x60 feet, core room 40x80 feet, and the molding floor is to be increased by an addition 66x170 feet.

The Greenville, Pa., plant of the American Steel Hoop Co. was compelled to close down a week ago on account of the shortage of steel. Operations will be resumed, however, in about ten days.

The capital stock of the Uniontown Engineering & Construction Co., of Uniontown, Pa., has been increased from $25,000 to $150,000. Four acres near Uniontown have been purchased and the work of enlarging the present plant will be commenced at once. H. L. Burnham, of New Castle, Pa., is president; O. W. Emrich, of Cleveland, vice president; George E. Sperling, of Pittsburg, secretary and treasurer. The company will manufacture rolling mill equipment and machinery for coal and coke plants.

General Industrial Notes:—

Under the law recently passed by the Texas legislature for the betterment of the State prison iron works, at Rusk, the penitentiary board has just acquired 60,000 acres of pine land on the Neches River. The pine will be used in making charcoal for the furnace. The amount of the appropriation was $150,000, and it is expected that the furnace will be modernized in every respect.

One of the batteries of coke ovens of the Maryland Steel Co., at Sparrows Point, was lighted last week. Coke will be used in the company's furnaces and the gas from the ovens will be utilized for heating and illuminating purposes.

L. H. Solosth & Sons, who have for a number of years past conducted a stamping, tinsmithing and machine works in Grand Rapids, Mich., have formed the Holland Stamping Works to manufacture steel ceilings and stove-boards. A building at Holland, Mich., has been purchased. The plant will represent an investment of $15,000, and there will be $18,000 worth of tools in the equipment. The present plant in Grand Rapids will be operated as it has been in the past.

The James A. Spargo Wire Co., Rome, N. Y., advises us that its business has grown so much that it has been obliged to run night and day. For this reason the capital was increased from $30,000 to $50,000.

The Dobbie Foundry & Machine Co., Niagara Falls, N. Y., has recently secured a Mexican order for hoisting engines for shipment to Vera Cruz.

The Sweet Steel Co., Syracuse, N. Y., has decided to secure a new location, as it finds that it is cramped in its present quarters. The plant may be removed to Oswego, N. Y., but this has not been finally decided.

The Taft-Pierce Mfg. Co., Woonsocket, R. I., whose plant had been closed while the receiver's inventory was being taken, has resumed operation under the receiver. The company employs 300 workmen.

The Strathy Wire Fence Co., Owen Sound, Can., has made an assignment.

The new plant of the Pacific Steel & Iron Co., Oakland, Cal., is now partially in operation. The building which has just been completed is 420x130 feet. The product consists of plain wire, wire netting, wire rope, and other kinds of articles.

The United States Locomotive Corporation has been formed in Chicago to take up the business of Torbert & Peckham, builders of locomotives, steam shovels, cars, etc. It is proposed to purchase the new plant of the firm at Hammond, Ind. The new corporation is to have a capital of $300,000, of which $100,000 will be 7 percent cumulative preferred stock and the rest common stock.

At Millersburg, O., March 26, a temporary injunction was granted to prevent the Brightman Mfg. Co. from removing its plant to Shelby. The company had already begun to ship its machinery. The petitioners claim the plant and part of the machinery do not belong to the company, as it was bought from a bond issue by the township. The bond issue was afterward declared illegal. The company manufactures shafting.

The following is a list of the slow-combustion buildings in St. Louis on which the Banner Works had the contract for the iron work: Tenth St. Realty Co. Bldg., Lindell Real Estate Co. Bldg., Washington University Ass'n warehouses, J. S. Merrell Drug Co., Hart Estate Building.